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Independent Assessment Of Auditable Unit E – Field Operations

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Section I: Executive Summary

The Texas Department of Transportation (TxDOT) contracted for five independent assessments of its management and business operations to prepare for the 2009 Sunset Review process. The auditable units to be assessed included: Transportation Funding, Contracting and Project Delivery, Consumer Services, Management and Support Functions and Field Operations. TxDOT retained Deloitte Consulting LLP (Deloitte Consulting) to conduct the independent assessment of TxDOT operations related to Auditable Unit E – Field Operations. The objectives of this independent assessment of Field Operations were to improve the quality of the statewide transportation services, identify opportunities for enhancing revenue, develop strategies to improve the efficiency and effectiveness of operations, highlight exemplary and innovative practices and recommend opportunities for reducing risks and improving operations at TxDOT Central Office. The results of this assessment are presented herein.

During the course of this engagement, we visited and/or interviewed personnel from nine Districts (four in-depth) and a number of Area Offices, and while extrapolating our findings and conclusions across all Field Operations is not perfect, we observed a variety of policies, processes, and situations that we believe represent business risks to TxDOT in its entirety.

During the review we also observed many processes and situations that can be categorized as leading business practices. While we noted that these practices are often found in specific Districts rarely did we observe where a "best" business practice was "rolled out" in a coordinated effort across all TxDOT Districts.

For both of these situations, areas of risk and leading business practices, the detailed analysis of findings, risks and impact they pose and our conclusions and recommendations are contained in the Detailed Findings, Observations and Recommendations sections contained in this report.

Summary of Findings

While there are numerous recommendations resulting from our review we noted a number of recurring themes that seem to be "root" causes that drive the behavior of the Districts and are directly related to our detailed, tactical findings that are presented later in this report. We believe that the following overarching themes, for the most part, drive the behaviors, processes and risks and opportunities within the organization.

Governance

During our interviews, we repeatedly heard that TxDOT believes in and encourages the Districts to be autonomous (decentralized). The reasons given are largely due to unique geographic requirements and geopolitical differences existing throughout the state requiring a local facing presence to address customer needs. While we agree that these conditions do exist, and that the decentralized business model is essential to TxDOT, there are attendant risks related to placing all of the responsibilities and functions in each District. In fact, there are services and functions that could more efficiently and effectively be provided from a regionalized or centralized, shared service environment. Examples of these "back office" functions include payables and receivables processing, required training and various information technology services.

While generally outside the scope of our work effort, we are aware that there are other organizations in the State that perform similar duties as TxDOT. These are namely, the Council of

Governments (COGs) and Metropolitan Planning Organizations (MPOs) where certain planning, design and project coordination occurs. Also, in some cases, COG, MPO and TxDOT boundaries overlap and we believe there may be an opportunity to improve communications and streamline business processes through some consolidation and/or coordination of redundant functions.

Additionally we observed some very creative solutions to business needs in some of the Districts that we visited. Unfortunately there does not appear to be a mechanism to identify, share or institutionalize these ideas across the organization. We believe that this is another example of the risks associated with the current governance structure.

We have made a number of recommendations suggesting that TxDOT consider modifications to its governance model and that place a greater emphasis on sharing of information, resources and certain business functions including modifying roles of both the Divisions and Districts. We are not suggesting that TxDOT move to a centralized approach to running the business but to consider functional areas where consolidation makes good business sense and to make sure that leading practices can be used throughout the organization instead of the fragmented use currently experienced.

Statutes and Policies

Statutes and policies in any organization are primary drivers of decision making and the required supporting business processes. Findings and recommendations relating to statutes requiring changes to the law have for the most part been omitted from our analysis. Policies, however, which can be changed through internal decisions and actions, appear to be a major contributor to issues we identified and drivers of work within the Districts. The adages that "we have always done it that way" and "we are doing this because it is a Division policy" were evident as we conducted our District interviews.

For example, even though the inspection resources in some Districts are stretched to capacity, there is a policy or belief that due to the importance of this function, TxDOT generally does not hire third parties to augment the inspection function. This practice is contrary to what we have observed in the private sector where developers and owners regularly use third party consultants to perform inspection services. A recent survey of state DOTs indicates that approximately 80% of the respondents use construction, engineering and inspection firms to assist with this important role in delivering quality projects. In fact, TxDOT in its own Comprehensive Development Agreement (CDA) "line of business" shares contracts with their partners for third party inspectors. It should be noted that TxDOT has taken steps to outsource certain inspection activities such as material testing to help ease the workload of inspectors. We believe that there are additional opportunities to expand this initiative to augment in house resources in situations of high demand.

We believe that current policies should be revisited and challenged in light of current and anticipated future business requirements and revised as appropriate. We have made recommendations in our detailed report that support this direction.

Technology

In organizations with older and outmoded systems we frequently see that this theme or root cause to be a major driver of the efficiency and effectiveness of managed workload. This is certainly the case at the Districts. We have highlighted a number of areas in our detailed analysis which are negatively impacted by the legacy technology used to process the core functional business applications. TxDOT is not unlike many other state DOTs that have older systems. We are aware of recent replacements of enterprise-wide systems (ERP) in North Carolina, Wyoming and Colorado.

Colorado's implementation took approximately 18 months and replaced 40 legacy applications with a single enterprise wide system which encompassed major applications such as payroll, payables, human resources, grants management and job costing. The efficiencies gained have been enormous.

While an undertaking of this magnitude from a human resource and cost perspective is great, we believe the benefits to be considerable and are worth the investment in the long run. We have made many recommendations related to system deficiencies that could be remedied with a new enterprise wide system.

Human Resources

People are at the heart of any business and during our visits at the Districts we observed a dedicated group of individuals focused on the mission of the organization and on delivering value to the citizens of Texas. Unfortunately, due to a variety of reasons the Districts are finding it harder to compete with the private sector for hiring and retention of both technical and non-technical resources, in part due to compensation and benefits. While some of this is due to State career service regulations, we observed that some Districts had implemented creative incentives such as mentoring, on-the-job training opportunities and project/experience rotations that have been designed to enhance worker satisfaction and retention. In the detailed analysis we noted these "leading practices" with the suggestion that they be rolled out to the larger TxDOT organization.

In situations where there is a deficiency in internal skills or where there is extreme demand for a particular type of skill we recommend that either hiring consultants or sharing resources between Districts be considered. Additionally, District and Division Offices should communicate training needs in areas where deficiencies in internal skills are identified.

There are other areas we noted where practices, such as the 11:1 worker to supervisor mandate and the budgeting of full time equivalent employees (FTE) rules, restrict District management's ability to optimally and competitively staff their organizations. We have provided recommendations that TxDOT initiate a human resource staffing study to develop a "zero based" approach to rationalizing and budgeting head count rather than the incremental approach based on historical staffing that is currently being practiced. Taking a fresh look at the staffing mix will help to align TxDOT's work force with the current needs of the organization.

We have also noted an apparent lack of performance measures that are either not in place or where they do exist, are not used for managing the business. There are a variety reasons for this which include issues we have identified related to timeliness, accuracy and credibility of project related information due to technology shortcomings and/or cumbersome and outdated manual processes. We have suggested a number of recommendations related to reinvigorating the performance measurement system.

Key Findings and Recommendations

The following section of the Executive Summary presents an explanation of identified key risk issues, our observations and recommendations for mitigating these key risks. A detailed discussion of these topics is presented in Section V of this report.

1.1 Project Development – Planning

Risk: Consistency and effectiveness of schedule planning and controls

Different levels of schedule planning and controls are being utilized by Districts throughout the project development phase and there are opportunities to strengthen the scheduling practices currently utilized by TxDOT. Numerous Districts have recognized this opportunity and are developing scheduling tools to improve planning, forecasting and the ability to identify potential issues. For example, two Districts are developing an advanced Critical Path Management (CPM) scheduling program to manage the entire project development life cycle from initial design through letting. The schedules created using this tool can be used to track detailed progress and forecast schedule information for planning purposes. In addition, the schedules can be viewed at the program level such that all the project schedules within one District or Area Office can be viewed at the same time, enabling management to easily identify projects that may be falling behind schedule and may need additional attention.

Developing standardized strategies and tools for managing project schedules throughout the state would improve execution of the planning process by facilitating early identification of potential issues in the development process such that the execution strategy could be adjusted to help ensure letting dates are achieved. Critical Path Management (CPM) scheduling can be used to model the hand-offs between various departments within the planning life cycle such as Design, Environmental and Right-of-Way (ROW). CPM scheduling can also model interactions between Area Offices, Districts, Divisions and external agencies such as the FHWA. The accuracy of the schedule progress could be improved and lessons learned / duration metrics could be utilized to improve future schedule planning.

Risk: Consistency and effectiveness of project budgeting and cost controls

Though all Districts are preparing internal budgets for each department, not all Districts are consistently monitoring and tracking project development costs on project by project basis. This hinders TxDOT's ability to evaluate execution performance and develop standards for managing project costs.

TxDOT should continue to develop its internal cost tracking tools, including the Total Project Cost initiative. The Total Project Cost initiative is being designed to track internal costs associated with design, environmental, ROW and construction work on a project by project basis. By developing these advance cost tracking tools, TxDOT will be able to develop performance metrics to guide the planning and management of future projects. In addition, tracking costs on project by project basis will provide a source of detailed information for customer requests, including legislative requests.

Risk: Consistency and accuracy of construction cost estimates

Project construction cost estimates are tracked in the Design and Construction Information System (DCIS) and are required to be updated annually; however, it does not appear that all Districts are consistently monitoring and tracking project progress against baseline estimates. Escalation of material costs in recent years has dramatically increased construction costs. These types of factors have placed increased importance on producing timely and quality estimates.

Standardizing and strengthening cost estimating controls can help to reduce the risk of cost overruns and associated funding difficulties. Developing controls to ensure that periodic updating is performed at an appropriate level of detail will improve the availability of current, reliable and accurate estimates. Tracking estimate information electronically will maintain a historical record of the project and any revisions to the estimate. Also, certain metrics should also be developed, such as measuring actual costs against baseline estimates and evaluating cost increases related to specific components of a project, to provide relevant data that can be used as a project management tool. Improved tacking of estimates should also help to establish accountability and encourage personnel to take ownership of their work. Finally, improved estimates will also enhance the quality of the financial planning, such as the one-year and three-year letting schedules, by helping to ensure that the project costs are current and accurate.

1.2 Project Development – Design

Risk: Adequacy of consultant design management

Due to the large and increasing size of the construction and maintenance programs, TxDOT does not have the internal capacity to perform all of the design work required. As such, approximately 65% (based on fees) of TxDOT's entire project development process, including design, is performed by outside consultants. This trend toward outsourcing more design work has placed increased importance on TxDOT's ability to effectively manage and monitor the large volume of external consultant work. In addition, there are certain risks associated with quality assurance and quality control (QA/QC) checks on consultant design work, as well as in-house design work.

We observed several design related operational strengths or leading practices being performed by certain Districts. One District we interviewed is in the process of creating a formalized procedure to track design progress from in-house design sections as well as consultants. This would require a committee to sit in on plan review at the initial, detail, and final phases of design. This District is also in the process of developing a checklist defining the requirements for each phase.

While other Districts, in general have a variety of checks and balances in place to monitor and control consultant costs and schedules, they should continue to develop formal processes to track and monitor consultant performance. Submittal milestones should be standardized for all Districts. Once requirements are defined, design sections and project managers should enforce and track all submittals for accuracy and completeness. Districts should adopt a more formalized plan review process that will promote early detection of potential errors and omissions (E&O) in design. This will mitigate risks to the construction process by reducing the change orders resulting from E&O. Division should revise and provide guidance on the claims portion of the E&O procedure that was recently rescinded. The E&O guidance should be clearly communicated to ensure the Districts understand their responsibilities with regard to identifying, tracking and correcting E&Os by consultants.

Risk: Effectiveness of training programs and knowledge transfer

Due to turnover and retirement of experienced design engineers, the training of young design engineers and the transfer of knowledge have become an important focus area for the organization. Not instituting effective training and knowledge transfer programs could impact the quality of services provided and the effective management of design consultants. We learned that most of the transfer of knowledge is being done through on-the-job training; however, there are limited formal mechanisms in place to ensure knowledge transfer.

One District we interviewed has formalized its rotation program and created a manual and guidelines to implement this program. Licensed engineers are also encouraged to participate to in the program to broaden their knowledge base and to gain a deeper understanding of TxDOT's key functions related to Design. The program also assigns senior staff as mentors and career guides to the young engineers.

TxDOT as a whole should continue developing initiatives to recruit and retain talent within the organization. The Districts should continue to participate and formalize the rotation programs to ensure that the next generation of TxDOT engineers is well-rounded, experienced and challenged in day-to-day tasks.

1.3 Project Development – Environmental

Risk: Development and tracking of schedules during the environmental process

The environmental approval process is very complex and is impacted by numerous internal and external factors. It is a critical aspect of the overall project development process that often times requires substantial time for ensuring that environmental policies, procedures and regulations are satisfied in an appropriate manner. For these reasons, delays in the environmental process can extend the overall duration of the project development process as well as extend the construction letting schedules. Varying levels of scheduling tools and controls are being utilized for creating and tracking environmental schedules across the Districts. A more consistent, timely and rigorous process for tracking and verifying project information during the project development life cycle would result in more accurate forecasting of project timelines, project costs and ultimately project letting dates. Improved tracking, scheduling and reporting tools could further increase the accuracy of project forecasts and provide higher levels of accountability.

Risk: Effectiveness of internal policies and procedures

During our review, concerns were raised regarding the consistent application and interpretation of environmental policies and procedures both at the Division and District levels. It appears that more time is now required for obtaining environmental clearance not only due to changes in laws, policies and procedures and heightened sensitivity to risk but also because of high turnover and having less experienced internal and external reviewers which negatively impacts the amount of time required for attaining environmental approval.

TxDOT should continue to enhance and encourage environmental training at the both Division and Districts to achieve consistency in interpretation of regulations and processes. This will help to ensure Districts are receiving consistent guidance and that approval criteria are being consistently implemented. Communication between the Division and Districts should be improved to help ensure that the expectations associated with the policies and procedures are clearly defined and to develop a common understanding of the environmental roles and responsibilities at all levels of the organization. TxDOT should consider implementing an objective cost-benefit approach in determining appropriate risk levels. Some level of risk may be tolerable and reasonable when the corresponding costs associated and time saved are considered.

To improve the process time required for environmental submittals, TxDOT should also explore the potential for implementing a concurrent review approach that includes simultaneous review by external agencies such as FHWA and EPA along with Division. The Environmental Division has previously explored the option of conducting concurrent reviews; however, it appears that concurrent review submissions suffered from poor quality issues and that anticipated process improvements were not achieved. Division is currently working to develop a QA/QC review process and Standards for Submission to be implemented at the Districts to improve accountability and the quality of environmental submittals to Division. Once these quality issues have been addressed, TxDOT should continue to explore the potential for a concurrent review process. This could be performed on a trial basis, where in specific types of documents are sent for concurrent review.

1.4 Project Development – Right of Way

Risk: Development and tracking of ROW acquisition costs and schedules

The Right of Way (ROW) acquisition process is affected by a number of variables including economic trends, political factors and legal disputes. The various scheduling philosophies and tools used throughout the Districts result in differing levels of effectiveness regarding tracking projects. A more consistent, timely and rigorous process for verifying and tracking information during the

ROW process will improve forecasting of project timelines, project costs and project letting dates. Developing detailed standardized scheduling and reporting tools could further increase the accuracy of project forecasting and provide higher levels of accountability.

Implementing a cost-benefit focused approach for determining appropriate risk levels with regards to ROW acquisition can add value for certain projects. Some level of risk may be acceptable when the corresponding costs associated with delaying a project's letting outweigh the benefit gained from removing the risk entirely. TxDOT should revisit their current ROW policies and associated risk tolerance.

We identified several operational strengths among the Districts during our review. For example, certain Districts are beginning the ROW mapping process during the environmental clearance phase. This strategy has been applied in an attempt to refine ROW procedures and streamline the acquisition process. We were also made aware that a ROW task force is currently examining the potential for delegating more authority to the Districts.

During the course of our interviews, the District personnel expressed concerns regarding the staffing constraints at the Division level. District personnel were satisfied with the support received from Division, given the extent of Divisions resources; however, Districts also suggested that Division's support and timely feedback could benefit from obtaining additional staff with more experience. TxDOT should examine the possibility of implementing a consultant contract within Division as well as within the Attorney General's Office. Due to staffing constraints at Division and the Attorney General's Office, supplementing their workforce with consultants would improve the time required to expedite reviews and approvals.

2.1 Project Delivery – Comprehensive Development Agreements

Risk: Effectiveness of CDA management and oversight

Comprehensive Development Agreements (CDA) are a relatively new contracting development and delivery model that TxDOT has begun to utilize to develop, design, construct, operate, maintain and/or finance transportation facilities. The project delivery methods created in the CDA process are not the typical design-bid-build process to which TxDOT is accustomed. In order to effectively deliver CDA projects, TxDOT needs to ensure that the District-level CDA project management and oversight are prepared for the flexibility and speed of construction afforded by the CDA process.

State DOTs are more often using a variety of arrangements and management strategies to capitalize on private investment and development interest, including: the use of Construction, Engineering and Inspection (CEI) firms to manage projects; implementing paperless project management; and establishing a Project Office and co-locating project personnel. TxDOT is successfully managing and performing oversight on a design-build (DB) contract and is forecasting that project to complete ahead of schedule and under budget. TxDOT assigns inspectors from a cross-section of District personnel to distribute experience with the CDA process and has conducted several training sessions related to the CDA process. Also, TxDOT has developed and effectively used several computer project management systems to automate the administration process.

TxDOT has taken steps toward developing more structure around the CDA process, including developing a programmatic system and technical requirements. Division needs to develop and communicate comprehensive policies and procedures for the Districts' management of CDA projects. Since few Districts have been exposed to or have any experience with the CDA process, TxDOT should continue to implement and expand the internal training programs to educate the CDA approach to the necessary Districts and Area Offices. The Districts will have to make the necessary changes to the organization staffing and management systems to support the policies and procedures as CDAs require a focus on management and oversight roles and prioritization of work during concurrent design and construction.

The Deloitte Financial Advisory Services team evaluating Auditable Unit B, Contracting and Project Delivery, will be providing more detailed findings and recommendations related to alternative project delivery methods.

2.2 Project Delivery – Construction

Risk: Accuracy and effectiveness of construction schedule planning and controls

The level of scheduling expertise and scheduling controls being utilized to plan and monitor construction projects varies across Districts and is an area that can be strengthened. While TxDOT is developing CPM scheduling resources, the management and oversight of contractor schedules and progress is somewhat inconsistent among the Districts and appears to be an informal process.

The construction industry is becoming more sophisticated with respect to planning, scheduling and CPM techniques. CPM scheduling is a powerful project management tool that offers great insight to management regarding critical project activities and how to adjust time, project budget and resources to meet schedule deadlines. Schedule data can also be used to identify potential delays and inefficiencies. TxDOT has initiated the process for entering into a $2,000,000 indefinite deliverable contract to provide CPM project scheduling services statewide (in addition to a $1,000,000 for the San Antonio District only). The services will include performing scheduling, monitoring and evaluating construction progress using CPM scheduling and training of CPM construction schedule analysis. This contract will facilitate the Districts' efforts to develop CPM skills, tools and strategies.

Districts should continue to develop in-house CPM scheduling resources and skills to improve the schedule planning, management, review, monitoring, control capabilities and general knowledge of the staff at multiple levels. This includes continuing to develop skills with Primavera Project Planner and Suretrak programs at each District through in-house or third-party training programs. TxDOT should also revisit the Standard Specifications and consider developing more defined and sophisticated scheduling requirements.

Risk: Effectiveness of change order process

The change order process is relatively efficient and has certain checks and balances to ensure that Districts follow the procedure and control the process of pricing, negotiating, approving and processing change orders. While TxDOT has a clearly defined process for administering change orders, the process has some inefficiencies and opportunities for improvement. Inaccurate coding during the changes order process presents a risk to TxDOT's ability to understand the cause of and mitigate future changes. Also, the approval amount limitations for change orders were indicated as an issue that could lead to unnecessary delays.

TxDOT recognizes the need to more closely track the causes for changes and has released an updated and expanded reason code list for more accurate and comprehensive reporting of changes in Site Manager. Also, several state DOTs establish varying levels of approval for change orders depending on the size of the change issue or whether or not the change is considered major when compared to the overall contract.

TxDOT should consider developing a committee/working group to evaluate the change order policy and leading practices and to monitor the performance metrics available from Site Manager's Change Order reporting capabilities, including the pricing of and the types of changes. TxDOT should also re-evaluate the change order signature authority limit required to process change orders at the District. TxDOT should consider revising the parameters defining the authorization levels and requirements to more closely align the authority limit to the size of the project, volume

of work or percentage of work. This could be accomplished by revising the authority on a project-specific basis in the special provisions.

2.3 Project Delivery – Maintenance

Risk: Effectiveness of controls on maintenance budgets

The Maintenance Function is responsible for a significant portion of the TxDOT annual budget and the effectiveness of controls on maintenance budgets represents a significant risk to the Districts. It appears that the current computer system only allows a limited number of users to access the system and extract and analyze information into spreadsheets. In addition, the process for entering data into the maintenance IR systems is completed manually and is a time consuming process prone to human error; thus, resulting in inaccurate information and inefficient rework. For these reasons, there are opportunities to improve the ability to accurately forecast and prepare budgets, manage budgets, report in-house expenditures, manage contractor progress and validate contractor estimates and costs both at Area Offices and Districts.

Districts currently utilize reports from the maintenance IR systems to compare productivity data and unit costs to the productivity and unit costs achieved by other Districts and Area Offices. This includes in-house and contractor costs compared to other Districts, Area Offices and state-wide. This identifies the high and low performers and focuses on potential best practices. The Districts also delegate responsibility for initial prioritization for funding to the Area Engineers to assure the most effective allocation of funds.

TxDOT has created a team consisting of Division and District personnel to evaluate and improve the current maintenance IR systems. The initiative is called the "Compass Project" and its goals are to provide useful tools and data to all management levels; improve user interaction; reduce the amount of data entered; and reduce the amount of time spent manually gathering information. The Compass Project should substantially improve the usability of the current IR maintenance systems and provide improved data management capabilities and reporting.

There is an opportunity to electronically automate the maintenance systems data entry process which would eliminate the potential for human error and improve accuracy. In addition, improved reporting and performance metrics will foster management's ability to make informed decisions. These improvements will result in greater efficiency and may allow for the allocation of FTEs to other functions. In the short-term, providing in-house training on the legacy systems and the Single Entry Screen (SES) system will help to emphasize the importance of accurate data entry and charging costs to the correct maintenance codes or sections.

2.4 Project Delivery – Inspection

Risk: Consistency, prioritization, effectiveness of inspection scheduling, planning, and controls

Districts are experiencing increased difficulty allocating qualified inspectors to the appropriate projects largely due to the significant increase in the amount of construction and maintenance projects being executed in recent years. In addition, TxDOT considers the construction Inspection Function to be representative of its commitment to quality to the Texas traveling public and therefore generally uses inspectors that are Full Time Equivalents (FTEs) of the organizations to perform the primary evaluations of its projects. TxDOT has begun utilizing commercial testing labs to help ease the work load of inspectors. In some instances, the Districts have also allocated design or maintenance resources to help manage the increase in inspection work.

Many private sector owners and state DOTs use Construction Engineering Inspection (CEI) firms for project inspection as a means of augmenting their staff. The CEI services may include performing daily inspection activities, materials testing, and project administration services. To maintain its commitment to delivering high quality projects while meeting increasing demand for inspection, TxDOT should evaluate its current practice of using only TxDOT inspectors and explore the possibility of supplementing its inspection staff with CEI firms. TxDOT should consider conducting a cost-benefit analysis to determine the advantages of enlisting outside CEI firms. The purpose of having CEI firms available to augment inspection resources is to meet the increasing demand for inspection services. Additionally, as third party inspection firms are retained, TxDOT would need to create standards of risk, quality and practices to ensure the consultants deliver services consistent with the organization's current business practices.

3.1 Support Operations – Human Resources

Risk: Employee recruitment and retention

The recruitment and retention of well qualified personnel has been expressed as a concern among many of the Districts. Career advancement and compensation appear to be the primary drivers of turnover. Districts have also experienced difficulties associated with recruiting highly skilled personnel. The largest areas of concern regarding personnel shortages are for design engineers, maintenance staff and inspectors. The metro areas in particular have experienced significant difficulties in recruiting and retaining technical staff, such as engineers and inspectors, due to increased market competition. In addition, the salary structure appears to be level across Districts and may not properly account for cost of living factors or competitive local market rates. We identified this as a potential risk pertaining to TxDOT's ability to effectively maintain an appropriate work force, with regard to head count as well as experience/education, for managing its internal operations and executing its core functions.

As a public entity, salary expectations are typically lower for TxDOT employees than for equivalent positions in the private sector. The additional benefits TxDOT offers can help to close the overall compensation package inequity. In spite of TxDOT's strong benefits package, many potential employees still tend to focus on the issue of salary as an area for improvement. TxDOT should benchmark salary and benefits to equivalent positions within the private sector and make adjustments in areas where there are significant discrepancies. While we understand that TxDOT cannot meet private sector salaries, it should position itself more competitively to retain and recruit high performing, experienced personnel.

Risk: Appropriateness of statewide FTE allocation

There appears to be a recent trend of reducing the number of FTEs within public organizations as mandated by the legislature. Based on this trend and the increase in overall construction volume in the recent years, we have identified the FTE allocation as a potential risk to TxDOT. A lack of sufficient FTEs and/or the inefficient utilization of existing FTEs will have a significant impact upon the efficiency and effectiveness of TxDOT's field operations.

Since FTE allocations are legislatively mandated, TxDOT does not have much control over the allocation process and the FTE caps. However, it would be worthwhile for TxDOT to conduct an analysis that takes into account growth over the last few years and the costs and benefits of performing work in-house as opposed to outsourcing the work and present its FTE needs to the legislature for consideration. We recommend that a state-wide review of resource allocations be performed. This would include identifying business workload drivers such as, dollar volume and number of inspections.

Risk: Effectiveness of Organizational Structure

A legislative mandate requires an 11:1 staff to supervisor ratio. Based on our discussions, this mandate creates certain disadvantages and inefficiencies within the Districts. This structure appears to be hindering the potential for career advancement and as such, is reported to have a negative effect on employee morale and contributes to staff turnover. Additionally, existing supervisors are now expected to carry the performance review loads and conduct performance reviews for employees with whom they have had limited interaction. It would be beneficial for TxDOT to conduct a study on the mandated 11:1 ratio, include the positive and negative impacts, and determine effectiveness of the policy. Presenting their findings to legislature may create an opportunity for policy revision.

Over the past years TxDOT has been outsourcing more work to consultants and this model has been successful for helping to meet the growing need for roadway construction. However, the significant increase in consultant work has created a need for strengthening TxDOT's project management capabilities. While many TxDOT employees have advanced technical skills related to their area of expertise, they may not be trained in managing and overseeing consultant work such as monitoring work progress, evaluating invoice payments, coordinating work tasks and ensuring compliance. TxDOT should evaluate the skill set required for managing consultant work and determine where training may be required for current personnel or if the current work force should be supplemented with more project management focused personnel.

Certain activities performed by the TxDOT Districts are similar to those performed by the Texas the Council of Governments (COGs) and Metropolitan Planning Organizations (MPOs). During the course of our review it was indicated that there may be opportunity to improve coordination, resource sharing and communication between these three organizations. Each organization has their own set of resources for performing planning, design and project coordination activities and there may be unnecessary duplication of efforts due to lack of communication or interagency planning. A case study should be undertaken to identify the specific areas of overlap between TxDOT, COGs and MPOs throughout the state and to evaluate the most appropriate organizational structure and resource allocation for executing any redundant work. An improved organizational structure and coordinated alignment of responsibilities could help to improve communication, streamline the decision making process, and improve the overall efficiency of the work performed by TxDOT, COGs and MPOs.

The current geographical structure of the TxDOT Distircts and the COGs should also be evaluated. Aligning the boundaries of these two organizations could improve coordination and streamline planning efforts. Currently the boundaries are very similar; therefore, large-scale geographical changes would not be required.

3.2 Support Operations – Finance / Accounting

Risk: Efficiency and accuracy of payroll collection data

The District and Area Offices are responsible for compiling information required for payroll time reporting and for allocating time to specific projects (job cost reporting) for all levels of the organization. The processes used to report payroll time and time for specific job costs are unrelated, separate efforts requiring duplicate data entry. There are two job cost reporting systems: the Single Entry Screen (SES) system and the Salary Labor Distribution (SLD) system. Additionally, the process used for job cost reporting is tedious and the results are prone to error. Reconciliations between all of these different systems must be performed to ensure they are in balance. Due to the length of time required to process job cost data and the unreliability of the information, the outputs are either not used or are not accepted by the users. As such, Districts and Area Offices do not regularly use this information to run their businesses. We also observed

that the reports generated from these systems are not timely and are generally not confidently used by District and Area management.

There is an excellent opportunity for TxDOT to explore implementing a system-wide Enterprise Resource Planning (ERP) system that includes capturing hours and time expended performing certain job tasks. While we did not specifically review the adaptability of the legacy system to allow for streamlining the data entry process and capturing job cost information, older mainframe systems are not typically designed to accommodate some of the newer types of data capture and transactions.

Risk: Rationalization and consolidation of Accounting Functions and resources

Current accounting practices may lead to inefficiencies related to processing vendor invoices for supplies and services. The current process utilized by the Districts may require unnecessary resources and therefore impact productivity of accounting personnel. While our review of this process was limited, there is opportunity to reengineer this area to realize greater efficiencies and cost savings. A complete flow chart of the process review should be performed to identify activities and tasks that could be modified or deleted.

3.3 Support Operations – Information Resources

Risk: Efficiency of IR Systems

IR systems are an integral part of TxDOT's business. Although there has been some implementation to update the current IR systems and use web-based applications, many of TxDOT's primary computer applications are mainframe or legacy systems. There seems to be an overall consensus that the mainframe and legacy systems are outdated and not user friendly. Updating or improving the IR systems may substantially improve productivity and efficiency within numerous functions of TxDOT. As the industry continues to grow and change, TxDOT should adapt its IR applications to meet the needs of the organization. A large scale implementation of updated IR systems will require further analysis; however, in the short term recommendations found in this report can be put into place immediately.

Acknowledgements

We commend TxDOT for undertaking this effort to assess its Field Operations. The above Executive Summary provides a high-level overview of the most common themes arising from our assessment; however, the entire report should be read in order to fully understand our observations and recommendations.

We appreciate the cooperation extended to our team by the employees of TxDOT, including personnel at Division, Districts, Area Offices and Maintenance Sections. These entities and their staffs contributed greatly to the quality of the project and the development of this report.

Section II: Background

Introduction

TxDOT provides a variety of diversified services to the citizens of Texas, all of which are focused on achieving its key goals including congestion relief, safety enhancement, economic opportunity expansion, air quality improvement, and asset value growth. To meet these goals, comply with statutory requirements of Transportation Code, Title 6, Chapter 201.109(b) (5) and to prepare for the 2009 Sunset Review process, TxDOT contracted for five independent assessments of TxDOT's management and business operations.

To facilitate the assessments, TxDOT divided its management and business operations into the following auditable units:

A. Transportation Funding
B. Contracting and Project Delivery
C. Consumer Services
D. Management and Support Functions
E. Field Operations

The Texas Transportation Commission determined that multiple vendors would be used in conducting assessments of the above units in order to gain professional expertise with differing perspectives and to promote independence. As such, Deloitte Consulting LLP (Deloitte Consulting) was retained to conduct an independent assessment of TxDOT operations related to Auditable Unit E – Field Operations, as referenced above and in Specification # TxDOT 946-20-10.

Objective

To align the independent risk assessment with the needs of TxDOT, Deloitte Consulting conducted the risk identification, evaluation, and analysis of the key management and business operations of areas related to Field Operations to achieve the following objectives:

1. **Quality** - Improve the quality of the statewide transportation services by providing counsel on ways to better manage resources;
2. **Increased Revenue** - Identify opportunities for enhancing revenue to maximize financial resources available;
3. **Efficiency** - Develop strategies to remove operational barriers and improve the efficiency and effectiveness of operations;
4. **Innovation** - Highlight exemplary and innovative practices, both internal and external to TxDOT; and
5. **Development of Opportunities** - Provide a conclusion(s) relevant to these objectives and recommend opportunities for reducing risks and improving operations at TxDOT Central Office.

Section III: Scope

Phase 1: Audit Plan and Risk Analysis

The scope of work for Field Operations required an analysis and evaluation of the activities, tools and procedures TxDOT utilizes to develop, deliver, maintain and administer the various components of highway or multi-modal projects. Within Field Operations, the suggested functional areas to be considered included, but were not limited to the following:

- **Project Development:** Planning, Design, Environmental Analysis, Right of Way (ROW).
- **Project Delivery:** Comprehensive Development Agreements (CDAs), Construction, Maintenance, Inspection, Materials Management, Traffic Operations, Access Management[1], Driveway Permits, and Development Setbacks on Major Corridors.
- **Support Operations:** Human Resources, Accounting/Finance, Purchasing & Warehousing[2], Inventory / Supply Operations, Information Resources, Internal Audit[3], and Public Relations.
- **Emergency Management**
- **Others:** During the January 9, 2006 kick-off meeting, TxDOT suggested that the Field Operations review also include Grants and Enhancement Programs.

Phase 2: Audit Plan and Risk Analysis

Phase 2 included the development of a work plan for our detailed, independent assessment. After approval of our Phase 1 Risk Analysis, a detailed work plan including a description of scope, activities, and major milestones was submitted for TxDOT approval.

Phase 3: Independent Assessment

Based on our Phase 1 analysis of the suggested functional areas to be considered for a detailed independent assessment, we identified 11 'Priority Review' areas. The independent assessment required an in depth analysis of the activities, tools and procedures utilized by TxDOT in the identified priority review areas:

- **Project Development:** Planning, Design, Environmental, ROW.
- **Project Delivery:** CDAs, Construction, Maintenance, Inspection.
- **Support Operations:** Human Resources, Accounting/Finance, Information Resources.

In addition to the analysis and evaluation performed on the above scope, we also performed assessments in conjunction with Auditable Unit B – Contracting and Project Delivery and Auditable Unit E – Management of Support Functions.

[1] Issues and opportunities related to Driveway Permits have been consolidated into the Access Management functional area.
[2] Issues and opportunities related to Materials Management and Inventory and Supply Operations have been consolidated into the Purchasing & Warehousing Function.
[3] Internal Audit was not part of the original scope, but issues and opportunities related to this area were identified during the review.

Section IV: Project Approach

In compliance with requirements defined by TxDOT, the approach for the assessment of each auditable area includes three primary phases.

Phase 1

Phase 1 included a high-level assessment of the risks associated with the management and business activities of the District and Area Field Operations. This assessment was conducted during the first 30 calendar days of the engagement. The information gathered in this phase served as a means for TxDOT to establish a priority and focus for the areas to be assessed during the execution of the audit work plan. At the completion of Phase 1, Deloitte Consulting developed and submitted the "Audit Plan and Risk Analysis" report.

In order to assess and evaluate TxDOT's Field Operations and meet the objectives of the Phase 1 risk analysis, we considered the various geographical locations of the different Districts, the relative size, and annual budgets of the Districts in order to independently identify Districts that could be representative of the entire state. In choosing Districts to review in detail we were mindful to include a range of Districts from each of the three size categories: metro, urban, and rural. We focused our efforts on the following seven TxDOT Districts in order to develop our Audit Plan and Risk Analysis[4]:

- Amarillo District (Urban)
- Austin District (Metro)
- Dallas District (Metro)
- Houston District (Metro)
- Lubbock District (Urban)
- Pharr District (Metro)
- San Angelo District (Rural)

To develop and complete our Audit Plan and Risk Analysis deliverable for Phase 1, we reviewed documentation from Divisions and Districts, conducted interviews, developed a risk assessment matrix, conducted a comparative analysis of information gathered and recommended focus areas for work plan development. We submitted the Audit Plan and Risk Analysis report on February 13, 2007. Shortly after submitting the plan we submitted our Phase 1 finding to the Audit Oversight Committee. On the March 26, our Audit Plan was approved and we began work on Phase 2.

[4] For purposes of this document, "audit" is a generic term that means analysis and evaluation of business operations as defined in TxDOT's RFP. This engagement was performed in accordance with the American Institute of Certified Public Accountants ("AICPA") Statement on Standards for Consulting Services. Due to the nature of this engagement, Deloitte Consulting was not retained to perform an evaluation of internal controls and procedures, and our services do not constitute an engagement to provide audit, compilation, review or attestation services as described in the pronouncements on professional standards issued by the AICPA or any successor standards setting body. Therefore, our findings do not result in the expression of an opinion or other form of assurance with respect to TxDOT's internal control systems or financial statements. Had Deloitte Consulting performed additional procedures, other matters might have come to our attention that would have been included in this report.

Phase 2

Phase 2 included the development of a work plan for conducting our detailed, independent assessment. The work plan included a description of scope, activities, and major milestones that served as a guide to the more detailed assessment of TxDOT's management and business operations. At the completion of Phase 2, we developed and submitted an "Audit Work plan" for review. The Work Plan was approved by TxDOT on April 11, 2007 and TxDOT provided tentative approval to begin Phase 3 on April 12, 2007.

Phase 3

For Phase 3, we adopted a similar District selection process as in Phase 1; however, due to the sizable scope and the in-depth nature of the assessment, we focused our efforts on four primary Districts. This approach allowed us enough time to perform a more detailed evaluation of each of the eleven Priority Review Areas within each of the four Districts. Appendix A, Work Plan Checklist, demonstrates the work performed against our Phase 2 work plan and tasks completed on the Priority Review Areas during our Phase 3 work efforts. In addition, we gathered information from other Districts in conjunction with the Auditable Unit B -Contracting and Project Delivery and Auditable Unit E - Management of Support Function.

As with the Phase 1 selection of Districts, we took into consideration the geographical locations, relative size and annual budgets of the Districts to identify Districts that could be representative of the entire state. We selected at least one District from each of the three size categories: metro, urban, and rural. The Districts selected for Phase 3 were:

- Atlanta (Rural)
- Austin District (Metro)
- Corpus Christi (Urban)
- Dallas District (Metro)

The following procedures were conducted to meet each of the objectives of the assessment:

Performed Document Review

We evaluated organizational, policy, procedural, and operational documentation related to TxDOT management at the Division, District and Area Offices. Appendix B, Documentation Review List, shows the documents received and reviewed during our Phase 3 work efforts.

Conducted District and Area Office Visits

We conducted visits with key personnel who are responsible for managing various functions during the project life cycle to gain an understanding of the project development, project delivery, and support operations processes. Appendix C, Individuals Interviewed, shows a list of TxDOT personnel interviewed during our Phase 3 work efforts. Topics discussed included their initial and ongoing communication with the Division personnel, challenges or inefficiencies in the functional processes, best practices, and other topics related to field operations.

Analyzed Processes and Procedures

We Assessed adequacy of processes and procedures within the District and Area Offices and evaluated consistency, prioritization and effectiveness of organizational practices and controls. Based on discussions and documentation analyzed, we then identified strategies for process

improvements, alignments and business transformations.

Identified Functional and Cross-Functional Issues/Opportunities

We looked at the 11 functions identified as potential risks in our Phase 1 report to identify and address Function Specific and Cross Functional issues/opportunities. We assessed how different functions work with one another to deliver projects and achieve TxDOT goals.

Cross-functional processes and procedures were analyzed to developed recommendations for improving the overall project life cycle as well as the supporting functional processes. For a portion of this scope, we worked with the other Deloitte Teams who are evaluating the other the Auditable Units to coordinate our analysis efforts

Identified Operational Strengths

As part of our scope, we identified and documented any operational strengths and exemplary practices currently being utilized by the Districts. At the same time we assessed the process used by the Districts and TxDOT as a whole to gather and disseminate best practices, lessons learned, and general issues/concerns encountered by Districts during the course of their operations.

Developed Report

Based on our observations and findings in Phase 3, our research into industry best practices, and suggestions gathered from District personnel, we developed recommendations for improving the work processes as it relates to field operations. Based upon the scope and nature of our review, we relied significantly upon interviews conducted with District personnel to develop our observations and findings. We also conducted reviews of supporting documentation including reports, actual field documentation and correspondence obtained from District personnel and project files. An effort was made to address all issues identified in our Phase 1 report. Our findings and recommendations were compiled and submitted in this Phase 3 report; "Independent Assessment of Auditable Unit E – Field Operations".

Section V: Detailed Observations, Findings and Recommendations

1.0 Project Development

1.1 Audit Area Project Development – Planning

1.1 Audit Area: Project Development - Planning	**1.1.1 Risk:** Consistency and effectiveness of schedule planning and controls

Background:

Based on conversations with District Engineers and their staff, different levels of schedule planning and controls are being utilized by the Districts. Though some Districts are currently developing tools and processes to better plan and track project development, it appears that baseline schedules used to plan, budget (labor hours), track and monitor the progress of the project development phase of the project life cycle are not being consistently developed in all Districts. We identified this as a potential risk pertaining to TxDot's ability to effectively and consistently utilize scheduling controls to manage the project development process and identify potential delays.

Observation/Findings:

Schedule Development and Management

- The Districts are using a variety of tools to manage schedules during the project planning phase. These tools are typically developed at the District level and many of them are milestone based tracking systems or spreadsheets. Some larger projects utilize Critical Path Management ("CPM") scheduling applications such as Primavera.
- The Design and Construction Information System (DCIS) stores the project letting dates and high level scheduling information. Several Districts have developed applications to pull pertinent schedule information from DCIS into project status report spreadsheets which provide a high-level snapshot of the project's progress.
- Schedule management is also typically departmentalized as each function, such as Environmental, Design, and ROW, has their own tracking tools. Project managers within each function have the primary responsibility for managing their function specific project schedule and ensuring that milestones are being met. Hand-offs between departments are informal and are typically communicated via email, telephone, or group meetings.
- The Transportation Planning and Development Department (TP&D) holds periodic meetings with the Area Offices and District personnel to discuss the portfolio of projects in the planning phase and to obtain project progress updates. The District uses the scheduling information gathered from these meetings to develop an overall project portfolio scheduling plan to manage letting dates and the long term project pipeline.
- The one year and the three year letting schedules are the primary management tools for ensuring projects are completed on time and that funding, allocated on a yearly basis, is being utilized to the greatest extent possible. The three year letting schedule and longer term plans are utilized to forecast and allocate anticipated future funding to projects that will provide the greatest value to the community.
- The Division monitors and tracks the one year letting schedule on a statewide basis. When a letting date is missed, the Districts are required to detail the specific reasons for missing a letting date and Division monitors this information. Aside from this Division level tracking system, most Districts are not formally tracking as-built schedule information.

Advanced Schedule Controls and Planning

- TxDOT has been conducting training and developing expertise with regard to CPM scheduling. Primavera scheduling software and associated training courses are being implemented throughout the state. Primavera is recognized as a leading industry software for schedule

1.1 Audit Area: Project Development - Planning	**1.1.1 Risk:** Consistency and effectiveness of schedule planning and controls

management for large capital projects.

- Several Districts have identified the need to develop detailed schedule controls that model the planning life cycle from conception/preliminary design through letting.
- Some Districts have developed integrated tracking systems which collect data from IR mainframe systems such as DCIS, the Environmental Tracking System (ETS), and the Right of Way Information System (ROWIS). The Districts' integrated systems collect information from the mainframe systems regarding several categories including: preliminary engineering, environmental, ROW, plan preparation and plan review. Gantt charts are then developed using this information to establish a baseline plan for the project development life cycle and the key activities are monitored to ensure schedules date are being met.
- Other Districts are developing advanced CPM scheduling tools to manage schedules during the project development phase. Please refer to the leading practices section for further information on this topic.

Impact:

There are opportunities to improve scheduling and planning coordination between all areas of project development including, design, environmental and ROW. The lack of advanced scheduling management controls may increase the risk of schedule delays as well as cost overruns and may impede the ability to identify potential issues in a proactive manner.

Operational Strengths / Leading Practices:

CPM Scheduling

CPM scheduling is a leading industry practice for large capital project planning and controls. In the planning stages, level I or II (summary level) schedules are typically utilized for managing the development process. CPM scheduling allows project managers to model activity relationships using logic ties and to evaluate the critical path and near critical paths to determine which activities are driving the project completion date. Various execution adjustments or mitigation scenarios may be modeled to evaluate schedule impacts.

Automated Project Development Scheduling System

- Two Districts have developed a formalized CPM scheduling tool called the Automated Project Development Scheduling System (APDSS) for creating and managing the schedules during the development process. The APDSS was developed in coordination with the Center for Transportation Research at the University of Texas. This system is designed to help project managers create accurate, quality schedules with ease. The primary goals of the system are to:
    - Improve the consistency of project scheduling;
    - Ensure project scope is fully developed;
    - Meet commitments to the public and investors;
    - Identify delays early enough to address issues;
    - Understand Design Offices ability to undertake additional projects (resource management);
    - Identify and fix process "bottlenecks";

1.1 Audit Area: Project Development - Planning	**1.1.1 Risk:** Consistency and effectiveness of schedule planning and controls

- Develop a database of actual project development durations to enhance future planning; and,
- Ensure projects are let on time.

- The APDSS schedule development process is intended to begin during the early stages of design, when enough information is available to develop the preliminary scope of the project. Front-end entry screens collect information regarding the various components of the project. From these inputs, initial default durations are created for the various activities within the planning process from preliminary design through letting. These default durations may be adjusted whenever necessary based on specific project details and conditions. Based upon the user inputs, the APDSS then creates a CPM schedule in Primavera scheduling software.
- The APDSS schedules are intended to be developed and managed by the project manager and the design personnel associated with the project. Schedules are to be updated on a periodic basis, potentially on a quarterly or monthly basis.
- The Primavera schedules developed from the APDSS system have the ability to track schedule information. Comments discussing changes to the project can be captured in the "Notes" section within Primavera. This provides an electronic storage area for documenting the history of the project and the reasons for delays or acceleration. In addition, the actual durations for certain activities can be tracked historically and this information may be leveraged to determine accurate durations for future projects.
- Each individual project schedule within APDSS can also be rolled up to a summary level view and organized by Area Office level. This view allows Area Engineers or the District TP&D Department to view the entire portfolio of projects at one time. This portfolio view facilitates management of the project workflow and project pipeline.
- The APDSS developer is also exploring the potential for resource loading schedules with required labor. This feature would provide a tool for TxDOT management to evaluate their personnel needs and allocate resources accordingly.

Conclusion / Recommendation for Improvements:

CPM Scheduling

- There are opportunities to strengthen the scheduling controls currently utilized by TxDOT. Numerous Districts have recognized this opportunity and are developing scheduling tools to improve planning, forecasting and the ability to identify potential issues.
- The DCIS system provides high level scheduling information and milestone tracking spreadsheets assist in tracking and monitoring progress. These types of tools may be adequate for smaller, simplistic projects; however, larger, more complex projects can benefit from using CPM scheduling techniques.
- Developing standardized strategies and tools for managing project schedules throughout the project development life cycle would improve execution of the planning process for future projects and improve the accuracy of reported schedule progress. Potential issues could be identified early in the development process such that the execution strategy could be adjusted to help ensure letting dates are achieved.
- A CPM schedule can be used to model the hand-offs between various department within the planning life-cycle such as Design, Environmental and ROW. It can also model interactions between Area Offices, Districts, Divisions and external agencies such as the FHWA. Developing

1.1 Audit Area: Project Development - Planning	**1.1.1 Risk:** Consistency and effectiveness of schedule planning and controls

these types of integrated schedules should improve communication between the various parties involved in the project as well as the management of the overall planning process.

- The schedule activities should be accurately and consistently updated to show percent complete for each activity. The critical activities and near critical activities should be evaluated to determine which activities are driving the schedule and where any delays may be occurring. Mitigation scenarios can then be developed to evaluate options for improving the project completion and meeting the letting date. These proactive efforts will help to identify potential issues and allow for mitigation in a timely manner.
- TxDOT should strengthen its schedule tracking capabilities. Tracking baseline schedules, progress updates and as-built durations can help to develop lessons learned for future projects. Project managers can leverage data from previous projects to refine the quality and accuracy of future project schedules. In addition, the notes section of the schedule can be utilized to track schedule changes for reference in the later stages of the project. Tracking this type of schedule information will document the history of the project and improve accountability.

Sharing APDSS

- TxDOT should explore sharing the APDSS scheduling system, as described in the above "Operational Strengths / Leading Practices" section, throughout the state. It will facilitate a more efficient and consistent approach to project development. The input templates provide a user friendly, standardized methodology for creating schedules. The system also provides a template checklist for developing the project scope and focuses the designers on each aspect of the project.
- This scheduling system is being implemented in two Districts and it has been positively received in both. There is opportunity to share this tool with other Districts. It may require some modifications based upon specific District needs and resources; however, the core application can be shared with ease.

Training

- TxDOT should continue developing its scheduling capabilities. Providing training for design and other personnel in Primavera and CPM scheduling will facilitate managing the project development process. Training will also improve TxDOT's ability to effectively review consultant schedules and monitor their progress. In addition, teaming with project management consultants that have expertise in scheduling will accelerate the in-house learning curve and assist with establishing procedures and processes for evaluating and updating schedules.

Performing Updates

- Training is the first step; however, project managers must also take ownership of the project schedule and be responsible for monitoring its progress and performing updates. Concerns were expressed regarding resistance to change for implementing new scheduling procedures such as APDSS. Developing a Standard Operating Procedure (SOP) for creating schedules and performing updates will ensure updates are being performed and the schedules are being monitored.

Developing Project Management Expertise

- Over the past years TxDOT has been outsourcing more work to consultants and this model has been successful for helping to meet the growing need for roadway construction. However, the significant increase in consultant work has created a need for strengthening TxDOT's project management capabilities. While many TxDOT employees have technical skills related to their area of expertise, they may not be trained in managing and overseeing consultant work such as

1.1 Audit Area: Project Development - Planning	**1.1.1 Risk:** Consistency and effectiveness of schedule planning and controls

monitoring work progress, evaluating invoice payments, coordinating work tasks and ensuring compliance

- TxDOT should evaluate the skill set required for managing consultant work and determine the training required for current personnel or whether the current work force should be supplemented with more project management focused personnel. TxDOT should retain its technical expertise to review and evaluate work being performed by consultants; however, adding project management personnel will allow technical staff to focus on their area of expertise while allowing project managers to focus on coordinating, monitoring and assessing consultant performance.

1.1 Audit Area: Project Development - Planning	**1.1.2 Risk:** Consistency and effectiveness of project budgeting and cost controls

Background:

Though all Districts are preparing internal budgets for each department, not all Districts are consistently monitoring and tracking project development costs on project by project basis. To improve its project management capabilities, TxDOT is currently developing internal cost tracking tools. Without tracking internal costs associated with design, environmental, ROW and construction work on a project by project basis, TxDOT is at risk of not being able to effectively evaluate project performance and develop standards for managing future projects.

Observation/Findings:

Tracking of Cost

- During the project development phase, hours are charged to Control Section Job (CSJ) cost codes. However, the current IR systems do not have the capability of producing aggregate project cost reports. Therefore, TxDOT's internal project costs are not formally tracked during the planning phase on a project by project basis.
- There are two primary types of costs associated with the project development phase:
    - Outsourced consultant work, which is managed by contract. TxDOT develops estimates for the scope of work and the consultant's work is managed to meet those targets.
    - Overhead and internal project development costs, which are currently not being monitored or evaluated on a project by project basis. Each department is allocated a yearly budget for their internal staff, which is managed within the department.
- TxDOT is currently working to develop a Total Project Cost system which will account for the overall project cost including indirect costs. Please refer to the Operational Strengths and Leading Practices for further information regarding the costs to be monitored in the Total Project Cost system.

Impact:

In our experience, consistently preparing, updating and monitoring budgets are keys to successful project delivery. The risks associated with the lack of enhanced budget metrics and controls may include: decreased effectiveness of financial planning, increased risk of delays and overruns, and decreased ability to measure the cost, schedule, and quality of work performed by TxDOT and its consultants.

Operational Strengths / Leading Practices:

Total Project Cost

- TxDOT is developing a Total Project Cost system which will monitor costs associated with the following areas:
    - Preliminary engineering
    - Construction
    - Right of Way
    - Bond Finance

1.1 Audit Area: Project Development - Planning	**1.1.2 Risk:** Consistency and effectiveness of project budgeting and cost controls

- Construction engineering
- Contingencies

- The Total Project Cost system is being designed to meet several key goals:
  - Create a comprehensive, single source system that captures development, ROW and construction costs;
  - Provide a responsive source of information for requests from customers, especially the Legislature; and,
  - Continue TxDOT's commitment as an innovative transportation leader.
- The Total Project Cost system is being developed within the DCIS system and is designed to create an overall project cost view for monitoring and reporting total project cost.

ProtoCost

- One District has developed a Projected Total Cost system called "ProtoCost." This system is designed to accomplish similar goals as the Total Project Cost system. ProtoCost contains several key features, including the following:
  - Cost estimating and tracking tool
  - Excel-based, Microsoft-SQL
  - Includes ROW, construction, utilities, engineering
  - Provides for inflation
  - Complements information in DCIS

Conclusion / Recommendation for Improvements:

- TxDOT should continue to develop its internal cost tracking tools, including the Total Project Cost initiative. By tracking internal costs associated with design, environmental, ROW and construction work on a project by project basis, TxDOT will be able to develop performance metrics to guide the planning and management of future projects. The metrics may be used to identify trends and also improve accountability.
- Developing a baseline or target budget on a project by project basis for planning activities would provide specific goals to work towards. TxDOT would then be able to track progress updates against the baseline and compile lessons learned. The budgeting process could then be refined using this database of information.
- Developing accurate cost tracking and forecasting tools will also improve resource management. Project managers and the TP&D department will be able to more accurately forecast their anticipated workload and make informed decisions regarding outsourcing work or performing work in-house.
- Accurately tracking costs on a project by project basis would enable analyses to be performed comparing the cost associated with outsourcing work to the cost associated with performing the work internally. These types of analyses would also require TxDOT's indirect cost to be taken into account as well as the cost associated with managing consultants.
- TxDOT should explore updating or replacing the current cost tracking system, primarily DCIS, to an integrated system that can track total project costs and that can provide more cost tracking/forecasting capabilities. A user friendly application with advanced query capabilities would enable users to create relevant reports and chart trends related to planning costs.

1.1 Audit Area: Project Development - Planning	**1.1.3 Risk:** Consistency and accuracy of construction cost estimates

Background:

Project construction cost estimates are tracked in DCIS and are required to be updated annually: however, it does not appear that all Districts are consistently monitoring and tracking project progress against baseline estimates. Based on discussions with District Engineers and their staff, project construction cost estimates appear to be "moving targets" that can change significantly during the planning stage depending on a variety of issues. Project cost estimates do not consistently consider contingencies to account for "unknowns," including escalation factors, particularly in the early phases of project development. The lack of accurate construction cost estimates and adequate cost controls to monitor progress against the estimates increases TxDOT's financial planning risk and may impact TxDOT's ability to effectively allocate funds and forecast future project costs.

Observation/Findings:

Budget Process

- Initial planning estimates are developed based upon historical costs or high-level estimates using cost per lane mile. The construction estimate is periodically updated as more information is gathered and as the design is developed. There is no formal process for updating estimates for projects with long lead times, i.e. four to five years and longer.
- As the project approaches the planned letting date, the construction estimate receives more focus. Once the project enters the three year letting schedule, the estimate is reviewed in detail each year by the TP&D Department. Estimates are also reviewed at certain key milestones including: the 30%, 60% and 90% design complete milestones.
- The controls for updating estimates appear to be informal. The District TP&D departments review the estimates periodically, typically on a quarterly basis; however, the extent of these reviews varies. Project managers have the primary responsibility for managing and updating the project estimates.
- It also appears there is no formal system for tracking changes in projected cost estimates. Project files track information regarding design changes and other high level information. However, baseline cost and updates are not tracked electronically and any changes are over-written by the next estimate update.
- Currently, estimated project construction costs are not escalated to the year of expenditure using inflation factors; however, there is an initiative to develop this capability within the DCIS system.
- Contingency figures are being utilized on some larger projects; however, there appears to be no standardized methodology for applying contingency. There is no disciplined strategy for developing contingency estimates associated with project risk and uncertainty.

Impact:

The lack of high quality and timely project construction cost estimates can decrease the quality of the short term and long term financial planning. This may impact the ability to evaluate the project pipeline, manage cash flows and develop realistic letting schedules.

1.1 Audit Area: Project Development - Planning	**1.1.3 Risk:** Consistency and accuracy of construction cost estimates

Operational Strengths / Leading Practices:

Industry leading practices for estimating roadway construction costs include the following:

- The project team continuously reviews the estimate for accuracy and to ensure that it is consistent with the project scope and execution strategy.
- The estimates are appraised at different stages of the planning process and all changes to the estimate are well documented. Periodic revisions in the estimate at regular intervals foster effective project management strategies and mitigate surprise escalations in project cost.
- The cost estimates of projects that span several years are escalated to the year of expenditure dollars to reduce any biased perception towards cost escalations by the public or the media.
- Contingencies are based on specific risk elements and are updated at different stages of the development process. The construction industry is increasingly using software programs such as Pertmaster, Crystal Ball and @Risk to identify risk and calculate contingencies.

Conclusion / Recommendation for Improvements:

- The current estimating process utilized by TxDOT provides a procedure for developing and updating estimates; however, there is opportunity to strengthen the cost estimating controls. Escalation of material costs in recent years has dramatically increased construction costs. These types of factors have placed increased importance on producing timely and quality estimates.
- Developing controls to ensure that periodic updating is performed at an appropriate level of detail will improve the availability of current, reliable and accurate estimates. Utilizing disciplined procedures or checklists for conducting updates may help to standardize the process and ensure thorough updates are performed.
- Estimates should be updated throughout the planning life cycle process and any changes to the scope and cost should be documented. Tracking estimate information electronically will maintain a historical record of the project and any revisions to the estimate. This information can be used to identify trends and improve the estimating process for future projects. Certain metrics should be developed, such as measuring actual costs against baseline estimates and evaluating cost increases related to specific components of a project, to provide relevant data that can be used as a project management tool. Improved tracking of estimates may establish accountability and encourage personnel to take ownership of their work.
- Estimates should be escalated to the year of expenditure. This can be accomplished by assigning an inflation rate per year to the proposed midpoint of construction. For larger projects, local factors should be accounted for, such as land acquisition inflation in high growth areas. Accounting for inflation will improve forecasting and long term project planning. For smaller projects, an overall statewide project inflation rate may be more appropriate. Additionally, reporting year of expenditure dollars could alleviate concerns that the media and the public may have associated with perceived project cost growth.
- TxDOT should develop procedures for incorporating contingencies into project estimates, particularly for larger projects. During the early stages of the estimate development, contingency may be used to account for uncertainty and risk. The contingency amount should be defined by specific risk elements and should be periodically updated as more information becomes available. The contingency should be reduced as more risk and uncertainty is defined.

Audit Area: Project Development - Planning	**1.1.4 Risk:** Effectiveness of sharing of information between Districts

Background:

Though all Districts interviewed believed that sharing of information was consistently occurring, no formal process or platform is utilized to share information regarding expertise, experiences, local operating procedures, leading practices, or other information in project development areas, such as budgeting, scheduling, environmental or ROW challenges. The primary methods of sharing information appear to be semi-annual and annual conferences, regionalized annual meetings, and e-mail. The sharing of information also appears to be geographically localized among the Districts and areas. We identified sharing of information as a risk because certain Districts may fail to realize the benefits of leading practices or other information being utilized by other Districts.

Observation/Findings:

- Sharing of information between Districts and Area Offices is an informal procedure and is done infrequently within the planning section. Sharing is more likely to occur regionally than on a state-wide level.
- Current opportunities for sharing information consist of the following:
    - Statewide Conferences and Meetings: These meetings have been beneficial for sharing high level information regarding leading practices and lessons learned; however, meetings typically occur only once a year.
    - Personal Relationships: Informal networking is a key source for sharing information within TxDOT and most employees are comfortable with contacting their counterparts in other Districts throughout the state or local region. Most of the information is conveyed by emails, telephone calls and verbally in-person.
    - Division Recommendations, Procedures, and Policies: The information provided by Division serves as a general guide for executing work and establishing standards.
- Aside from the statewide conferences, there is no formal platform for Districts to directly share ideas, concerns, leading practices and other information.
    - Therefore, innovative leading practices may not be efficiently shared throughout the state. Numerous Districts may have a similar need and develop their own solutions to solve the same issue. Additional effort is required when several Districts are developing similar solutions and essentially 'recreating the wheel'. There is no unified source to discuss common issues and solutions that can serve as a "Lessons Learned" for other Districts.

Impact:

Without improved communication procedures TxDOT may fail to identify and share beneficial leading practices throughout the organization. TxDOT may fail to realize efficiencies associated with sharing solutions which may impact quality and reduce risk of delays and cost increases, in both, the project development and project delivery areas.

Operational Strengths / Leading Practices:

Currently, one of the most effective means for distributing information occurs through a network of personal relationships.

Audit Area: Project Development - Planning	**1.1.4 Risk:** Effectiveness of sharing of information between Districts

- Many relationships are developed on regional basis due to proximity and because they may be facing similar regional challenges.
- The existence of societies, learning opportunities and conferences are prime channels for facilitating personal networks.

Conclusion / Recommendation for Improvements:

Effectively gathering and disseminating the collective knowledge within TxDOT has the potential to benefit the Districts in the planning and development phases. Sharing issues, concerns, corresponding solutions and leading practices would assist Districts in more accurately managing and scheduling the planning process. Areas to consider include:

- Focus on sharing information, starting with intra-District, neighboring Districts, Regions, and concluding with state-wide distribution.
- Create more opportunities for personal networking to establish more cross-District and Division interaction and relationships.
- Distribute information via regular correspondence such as monthly emails/newsletters.
- Perform follow-up to determine if recommendations are implemented and to analyze what their effect has been.
- Create more interactive conferences or meetings that focus on brainstorming solutions to resolve commonly encountered issues. Promote and encourage District staff to attend these conferences, and allocate time and budget to enable successful interactions among Districts and Division.
- Explore the potential for creating issue specific email groups or online resources for sharing concerns and/or leading practices.

1.2 Audit Area Project Development - Design

1.2 Audit Area: Project Development – Design	**1.2.1 Risk:** Rationalization and consolidation of design resources at the District level

Background:

Although the organizational structure at local District Offices varies, most Districts have design engineers located at both the Area Office and at the District Office. Based on the complexity of a project, and the availability of resources and expertise, design services are performed at either location or are outsourced to third party consultants. There appears to be differing opinions in the field as to where internal design resources are most appropriately located; at the District or at the Area Office. Certain Districts have begun the process of strengthening their design sections at the District office to improve the skills of their design engineers while other Districts believe that the training and exposure to different design disciplines is best provided at the Areas Offices. There are certain risks and benefits associated with each of the strategies that need to be addressed.

Observation/Findings:

- Districts use various approaches to manage their design sections. While some Districts are consolidating their design resources at the District level, others are increasing the responsibilities of the design teams located at the Area Offices.
- We observed that several Area design sections have been consolidated and downsized from 20 to 25 design engineers to about three to four. Other Area Offices have completely eliminated their design sections and rely on the District design section.
    - Districts that have consolidated their design sections at the Area Office level perform the majority of in-house design work, plan review and consultant management at the District level.
    - Additionally, these Districts believe that there is potential to increase personnel exposure to various aspects of design and increase cross-training if situated at the District office.
- On the other hand, some Districts are strengthening their Area design sections and are encouraging a more decentralized approach to internal design and the management of consultant contracts through the Area Offices. The responsibilities of these Area Office design teams include internal design, consultant plan review, administrative management of consultant contracts and interaction with design consultants during the construction phase of the project.

Impact

Having Districts allocate their design sections differently creates an inconsistent organizational structure within TxDOT that can lead to inefficiencies in operations. The inconsistent structure:

- Does not portray TxDOT as a unified organization;
- Makes management of consultants inconsistent due to differing review structures; and,
- Results in inconsistent means of interaction with consultants during the construction phase of projects.

Operational Strengths / Leading Practices:

Districts are identifying the organizational structure and allocating design sections between the

1.2 Audit Area: Project Development – Design	**1.2.1 Risk:** Rationalization and consolidation of design resources at the District level

District Offices and the Area Offices to best suit their needs.

Conclusion / Recommendation for Improvements:

Though each District has different needs for design resources, and a one-size fits all approach may not be applicable, TxDOT should conduct a study to determine the best practice to suit the needs of the organization.

- Strengthening the District design section will promote increased sharing of knowledge, more complete on-the-job training, and sharing of best practices and lessons learned within the Design Function. These efforts may provide a greater opportunity to increase the range of design expertise and specialization. Advantages of consolidation include:
    - District design sections can focus on design rather than other issues associated with construction that typically utilize significant resources at the Area Offices.
    - District design sections can focus on management of projects at a global level and effectively administer and disseminate information from a single source.
    - Districts can spread workload between Area Offices as necessary and can account for varying needs of Districts.
    - This structure would foster greater teamwork and learning, increase efficiency and expand expertise.
- At the same time, considerations should be given to the Area design sections for smaller maintenance design projects, review of consultant design and assistance during execution of projects. The advantages of strengthening Area design sections are improved efficiency and quality of design through the following:
    - Familiarity with the local area and existing infrastructure helps in the prevention of errors and omissions in design tied to field conditions;
    - Proximity to the site, and a better understanding of local conditions leads to more project ownership; and
    - Quick turnaround times in responding to Requests for Information (RFIs) during the construction phase of the project.

1.2 Audit Area: Project Development - Design	**1.2.2 Risk:** Adequacy of consultant design management

Background:

Due to the large and increasing size of the construction and maintenance programs, TxDOT does not have the internal capacity to perform all of the design work required. As such, approximately 65% (based on fees) of TxDOT's entire project development process, including design, is performed by outside consultants. In light of this fact, we identified consultant management as a potential risk associated with TxDOT personnel not being equipped with the experience and/or skill sets to effectively manage and monitor the large volume of external consultant work. In addition, there are certain risks associated with inadequate quality assurance and quality control (QA/QC) checks on consultant design work, as well as in-house design work.

Observation/Findings:

Tracking of Consultant Schedules

- There are basically two types of consultant contracts used at the District level:
    - Evergreen contracts are indefinite delivery contracts that provide for an indefinite quantity of specific services to be furnished during a two year period with a limit of $2 million of fees that can be awarded to each consultant. For these contracts, the general scope of services (ex. Bridge design, hydraulics) that the consultant is approved to provide and the hourly and unit rates are specified in the evergreen contract language. Approvals for specific services are provided in Work Authorizations for evergreen contracts which contain a detailed project scope.
    - Project specific contracts on the other hand are based on a single project and include a detailed project specific scope and rates.
- A Design Project Manager within the District is assigned to every project to monitor consultant progress. Consultants procured using either of the contract types are expected to meet certain milestones, and are tracked similarly.
- There is a lack of consistency in the methods used by Districts to track the PS&E schedules of their design consultants. Typically, Districts require submittals at 30%, 60%, and 90% completion of design, though this varies between Districts and with the size and complexity of projects.
    - For example, smaller, more standard projects might not require a 30% or 60% submittal, but only require a review at 90% of design completion. For example, projects such as hydraulics/hydrology, geotechnical investigations, and laboratory testing do not fit the 30%, 60% and 90% reviews schedule.
    - Changes to the scope of the project are not tracked to adjust the percent complete of design submittals.
- Most Districts have a checklist that mandates the requirements for each of the submittals. However, the design sections do not always enforce the requirements and there is no method or procedure in place for ensuring the accuracy and completeness of submittals.
- Typically, consultants are informed about deficient submittals informally, either in conversation, via email, or over the phone. The corrections and additional details needed to complete the requirements of a scheduled submittal are then reiterated by the Design Project Manager and consultants are required to re-submit the package. However, this process is often not tracked or documented effectively by the District.

1.2 Audit Area: Project Development - Design	**1.2.2 Risk:** Adequacy of consultant design management

- One District we interviewed is in the process of creating a formalized procedure to track consultant progress. Refer to the 'Operational Strengths/Leading Practices' section for details.

- On Evergreen contracts, the District approves changes to the scope of work that a consultant can provide and time extensions via a Supplemental Work Authorization, so long as the associated costs stay within the $2 million cap and the extensions stay within the 2 year period of the contract. If the amount of the Work Authorization or the aggregate amount of the Work Authorizations reach or exceed $1 million, Design Division approval is required. A Supplemental Agreement is executed and approved by Division for scope changes and time extensions that either exceeds the cap or the time period of the contract.

Tracking of Consultant Costs

- The contract expiration and the dollar expenditures against the cap are closely monitored to ensure consultants stay within the contractual limits. Some of the larger Districts believe the recent change in the evergreen contract cap from $5 million to $2 million restricts their ability to efficiently manage their business.
- Consultants are typically paid on deliverables. Consultants submit an invoice to the Design Project Manager who checks the accuracy and completeness of the deliverables and verifies that the invoice reflects the work completed. If required, the PM may request for additional information or drawings prior to signing off on the invoice.
- Internally, some Districts are experiencing delays and inaccuracies in the plan reviews conducted by the Area Office design sections on consultant design submittals.
- Some Districts believe that more guidance and training from the Design Division would be beneficial for more accurately estimating hours and work scope to avoid the process of issuing Supplemental Work Authorizations.

Quality of Consultant Design and Execution

- In some instances, certain Districts we interviewed believe that consultant design does not meet the same level of quality as TxDOT designed projects
- Some Districts believe that consultants are not always familiar with the roadways and the required TxDOT design standards and therefore are unable to deliver the quality TxDOT expects.
- If construction field conditions require changes to the design, Districts believe that internal design sections can respond faster to requests than consultants.
- Some Districts have begun requiring that consultants implement a formal QA/QC process on plans prior to submittal. This helps mitigate errors resulting from consultants submitting incorrect, incomplete or un-reviewed drawings in order to meet milestones.
- There is no consistency in correcting the designs for changes caused by consultant Errors and Omissions (E&O) during the construction phase of the project, and for accurately coding and allocating the responsibility for those changes.
- Division distributed an E&O policy to the Districts to address correction and collection procedures. However, the claims processing portion of the policy was rescinded after concerns were addressed at hearings with the House Government Reform Committee and the Senate Government Reform Committee. A memorandum from Steve Simmons dated March 30, 2007, stated only the claims portion of the procedural guide was being amended. No revised claims procedure had been distributed to the Districts at the time of this report.

1.2 Audit Area: Project Development - Design	**1.2.2 Risk:** Adequacy of consultant design management

- Although Districts are required, at a minimum, to perform yearly evaluations of consultants, not all Districts have performed these evaluations on a timely basis.

Impact:

With the increase in consultant design work, management of consultants is becoming a critical function within TxDOT. Not having effective project management tools for reviewing and evaluating external design along with accurately responding to questions could potentially impact the accuracy of payments being made to consultants, the early detection, mitigation and allocation of responsibility of errors and omissions, and the construction schedule of projects due to changes.

Operational Strengths / Leading Practices:

- One District we interviewed is in the process of creating a formalized procedure to track design progress from in-house design sections as well as consultants. This would require a committee to attend plan review at the initial, detail, and final phases of design. A checklist is being developed to define the requirements for each phase.
- One District has begun setting up regular meetings with the consultant community in order to update them on upcoming projects, TxDOT's expectations and standard operating procedures.
- Another District has begun providing formalized training to their consultants on TxDOT standards and requirements.

Conclusion / Recommendation for Improvements:

While there are a variety of checks and balances in place to monitor and control consultant costs and schedules, Districts should continue to develop more processes to track consultant performance. Examples include:

- Submittal milestones should be standardized for all Districts. Understandably, smaller projects might not require as many milestones; nonetheless, Districts might benefit from having a procedure to identify and define projects and standardize requirements based on complexity and size of projects. These checks would aid in determining consultant invoices for accurate payments against deliverables.
- Once requirements are defined, design sections and project managers should enforce and track all submittals for accuracy and completeness. Any issues with submittals should be documented and used during the evaluation of the consultants.
- Internally, Districts should have a 'clock' on the turnaround times for consultant plan reviews. This could potentially reduce time extensions requested by consultants and would help in achieving letting schedules.
- Districts should adopt a more formalized plan review process that will promote early detection of potential E&O in design. This will mitigate risks to the construction process by reducing the change orders resulting from E&Os.
- Division should revise and provide guidance on the claims portion of the E&O procedure that was recently rescinded. The E&O guidance should be clearly communicated to ensure the Districts understand their responsibilities with regard to identifying, tracking and correcting E&Os by consultants.
- Districts should take a more proactive role in communicating with the consultant community

1.2 Audit Area: Project Development - Design	**1.2.2 Risk:** Adequacy of consultant design management

and keeping them informed on TxDOT requirements, standard operating procedures and evolving design requirements.

- The steady increase in outsourcing is necessitating that TxDOT assume greater project management responsibilities. To be effective in this role, TxDOT should consider the following:
  - Consider developing Project Management skills within the organization through implementing more training programs to support management of outsourced work.
  - Develop and introduce policies and procedures to address the shift in roles and responsibilities of the organizations.

1.2 Audit Area: Project Development - Design	**1.2.3 Risk:** Effectiveness of training programs and knowledge transfer

Background:

Due to turnover and retirement of experienced design engineers, the training of young design engineers and the transfer of knowledge have become major risk areas within the organization. We learned that most of the transfer of knowledge is being done through on-the-job training; however there are limited formal mechanisms in place to ensure retention and transfer of institutional knowledge transfer.

Observation/Findings:

- All Districts agreed that Division offers excellent training programs for engineers. Courses are classified by level and conducted at regular intervals. However, there are no set requirements to be met by personnel. Additionally, there is no formal counseling available to engineers.
- Many Districts encourage young engineers to rotate between different Design and field teams to gain exposure to a wide variety of experience. This prepares them for the Professional Engineer's exam and helps them become well versed in different types of TxDOT projects.
    - This rotation is not mandatory and is at the discretion of the District Engineer. Due to work load demands, these rotations are difficult to execute.
    - A mandatory job rotation program is in the process being implemented state-wide.
    - Rotations generally include design, construction and field experience.
- Some Districts are in the process of standardizing their design review process. This prepares the District in case of turnover; uniform procedures facilitate the efficient transition of institutional knowledge in the form of standard procedures.
- In many Districts there appears to be a void between personnel with more than 20 years of experience and those with less than five. This poses a significant risk to TxDOT, as this gap in experienced resources will result in the loss of institutional knowledge as more experienced engineers retire.
- Certain Districts have a Young Engineers Group, which is a voluntary organization for engineers. This facilitates networking with different Area engineers, different disciplines and promotes career path discussions.

Impact:

There is a potential for TxDOT to lose a significant portion of its institutional knowledge in a few years, when about 70% of executive managers and about 27% of all current employees will be eligible for retirement. Compounding this is an expanding private market with higher salaries. Not instituting effective training and knowledge transfer programs could impact:

- The quality of services provided by TxDOT due to insufficient experience and knowledge;
- The effectiveness of consultant management due to lack of project management skills; and,
- The overall organizational structure due to lack of technical skills to conduct design in-house or review consultant design.

1.2 Audit Area: Project Development - Design	**1.2.3 Risk:** Effectiveness of training programs and knowledge transfer

Operational Strengths / Leading Practices:

TxDOT Strengths

- One District has formalized its rotation program and created a manual and guidelines to implement the program. Licensed engineers are also encouraged to participate to further develop their careers. The program also assigns senior staff as mentors and provides career guides to the young engineers.
- All Districts effectively utilize on-the-job training by rotating design engineers through different facets of design to understand the different design disciplines, which include roadway design, bridge design, hydraulics etc.
- TxDOT's training programs are a key marketing tool used to attract young talent into the organization.

Conclusion / Recommendation for Improvements:

The Districts should continue to develop and encourage participation in the rotation programs to ensure that the next generation of TxDOT engineers is well prepared to address the transportation needs of the future. With the ever-increasing use of third party consultants, it is essential that the organization provide training and experiences for the changing demand; from the type of services that have traditionally been provided by in house resources to those services required for reviewing and managing consultant designed projects.

- Project Management (PM) skill are a necessary core competency for the future. TxDOT should consider implementing training programs to equip their design personnel with consultant management skills.
- The rotation program should be a requirement for young engineers to enhance skill-sets and comprehensive understanding about all aspects of design. Every young engineer should choose or be delegated a mentor among the senior staff members who would help guide engineers with goals and career paths. In addition, TxDOT should consider requiring design engineers to take environmental processes and documentation training. This will help to ensure project designs are developed in accordance with environmental requirements.
- Districts should formalize their rotation program and include milestones to measure progress of the program. Since a few Districts have already begun formalizing their rotation programs, it would be beneficial for the Districts to collaboratively discuss existing programs and tailor it for specific needs. As a result, the programs will have some consistency, but can be flexible to suit local needs.
- TxDOT should implement a process by which leading practices developed by Districts can be communicated to Division and ultimately disseminated state-wide.
- Districts should encourage their young engineers to be a part of the Young Engineers group within TxDOT and use it as a platform to network, enhance skill-sets and to discuss career paths.

1.2 Audit Area: Project Development - Design	**1.2.4 Risk:** Employee recruitment and retention

Background:

Several Districts have expressed concerns regarding the recruitment and retention of qualified engineers. TxDOT's young engineers, particularly those that have received their professional engineering license are being recruited by the private sector. Similar concerns have also been voiced regarding the retention of more experienced design engineers. TxDOT's organizational structure appears to be inflexible with regard to providing alternate, technical based career paths within the organization. Experienced engineers with significant technical expertise need to take supervisory positions in order to advance in the organization. As such, the professional growth potential and salary growth potential of engineers with technical expertise who desire to remain technically focused appears limited due to a lack of higher level non-supervisory technical positions which could potentially lead to turnover of qualified TxDOT engineers and difficulty in the recruitment of engineers with technical expertise.

Observation/Findings:

Employee Recruitment

With an extremely lucrative and competitive market for engineers, most Districts are having a difficult time recruiting design and engineering talent into TxDOT.

- Some Districts realize that training for young engineers is the key selling point for TxDOT careers and have taken certain measures to attract graduating engineers into the organization
    - In most of the Districts we interviewed, Engineers-In-Training (EITs) are rotated between different design teams to gain a variety of experience.
    - After a few years of training these engineers are assigned a project to handle from start to finish.
    - TxDOT is in the process implementing a mandatory job rotation program state-wide.
- The challenge is retaining EITs that have obtained their PE license. Once EITs have gained some experience and have obtained a PE license, they are recruited to the private sector.
    - Therefore some Districts actively recruit new graduates on an on-going basis to maintain the staffing levels and mitigate the effect of the attrition of engineers to the private sector.
    - Most Districts are actively involved in research programs with local universities and recruit potential candidates from the graduating class.
    - TxDOT also has a tuition assistance program that pays for college education. However, once potential candidates graduate, the private sector is ready to pay off the tuition to TxDOT and hire the engineers.
- TxDOT also has an Internal Referral Program where employees get a paid day off for assisting in the hiring process.
- Certain Districts believe that there is a public perception that it is hard to get hired at TxDOT due to the cumbersome hiring process. Some of challenges described include: difficulty in finding TxDOT job openings, the lack of job openings listed on search engines such as "jobs.com" and the length of time required prior to job offers being made. There is no plan at either the District or Division level to change that perception and market TxDOT careers more aggressively.

1.2 Audit Area: Project Development - Design	**1.2.4 Risk:** Employee recruitment and retention

- There are other issues that affect the recruitment efforts which cover all functions within the organization. Refer to the HR section for more information on these issues.

Employee Retention

TxDOT has adopted various initiatives to retain talent within the organization. A number of these initiatives are discussed below along with other factors affecting retention.

In general, Districts have difficulty retaining their licensed engineers with five to ten years of experience. Most of the turnover is due to engineers seeking higher salaries within the private sector.

- TxDOT recently conducted a state-wide study to evaluate parity in salaries within each job classification and number of years of service among Districts.
    - TxDOT gave the Districts additional money to alleviate any parity issues.
- One District we interviewed shares its compensation structure with an external firm that conducts a survey to assess engineering salary structures for the area. These results are then reported back to TxDOT, which then evaluated the parity between TxDOT and the private sector.
    - The study did not include an analysis of all the benefits afforded to TxDOT personnel.
    - The same District also presented a comprehensive view of benefits to highlight the competitiveness of TxDOT's overall package compared to the private sector and shared the results with its personnel and other Districts.
- According to TxDOT personnel, merit based salary increases have been reduced greatly over the years, making it difficult to match, or even maintain the difference between TxDOT and the private sector.
    - The merit money of 1.7% per annum can be used to help improve compensation; however, the salaries seem to be falling farther behind the private sector.
    - A particular District has adopted a policy where 'they pay those they cannot afford to lose'. These individuals always get a merit increase to keep them within TxDOT.
- Location of personnel within the State also affects the retention efforts.
    - In urban and rural Districts, there is always a lure of the more developed metro Districts, with more opportunities and larger compensation packages.
    - However, in the metro Districts, the presence of the private sector is much stronger, and therefore attracts a lot of engineers away from TxDOT.
- With a steady increase in design work being performed by consultants, most Districts are being mindful to keep a variety of good projects in-house for engineers to work on and develop their skills and careers. This maintains the interest of in-house engineers, and prepares them to manage and review more complex designs prepared by consultants
- There are other issues that affect the retention efforts which are not limited to engineers only, but cover all functions within the organization. Refer to the HR section for more information on these issues.

1.2 Audit Area: Project Development - Design	**1.2.4 Risk:** Employee recruitment and retention

Impact:

Qualified and experienced professional personnel are an asset to any organization. Similar to the training and knowledge transfer section, not instituting sufficient recruitment and retention programs could impact:

- The quality of services provided by TxDOT due to insufficient experience and knowledge of new employees;
- The effectiveness of consultant management due to lack of project management skills; and,
- The overall organizational structure due to attrition of technical skills to the private sector.

Operational Strengths / Leading Practices:

TxDOT Strengths

- A District presented a comprehensive view of benefits to highlight the competitive overall package compared to the private sector and shared it with its personnel and other Districts.
    - Explains in detail the benefits (including future unrealized benefits) to its employees.
    - Bridges the compensation gap between TxDOT and the private sector.
    - Promotes retention by comparing work-life balance between the private sector and TxDOT.
- Most Districts are being mindful to keep a variety of good projects in-house for engineers to work on and develop their skills and careers. This also helps in retaining interest in the work performed and in increasing the ability to review consultant design.

Conclusion / Recommendation for Improvements:

TxDOT should continue developing initiatives to recruit and retain talent within the organization. A more aggressive approach could be taken in marketing the overall benefit of working for a state agency.

- The Districts should continue to participate and formalize the rotation programs to ensure that the next generation of TxDOT engineers is well-rounded, experienced and challenged in day-to-day tasks.
- TxDOT should consider marketing career opportunities more aggressively in the market.
    - Advertising should emphasize the exceptional training and variety of experience afforded by TxDOT.
    - The program should also outline all benefits and offer an analysis of benefits to bridge the gap in compensation parity between TxDOT and the private sector.
- TxDOT should consider increasing performance based incentives to retain the most critical segment; personnel with five to ten years of experience.

1.3 Audit Area Project Development – Environmental

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

Background:

The environmental approval process is very complex and is impacted by numerous internal and external factors. It is a critical aspect of the overall project development process that often times requires substantial time for ensuring that environmental policies, procedures and regulations are satisfied in an appropriate manner. For these reasons, delays in the environmental process can extend the overall duration of the project development process as well as extend the construction letting schedules. The timing and strategy for creating and tracking environmental schedules is not being consistently implemented across the state and some Districts are not utilizing or are under utilizing scheduling software.

Observation/Findings:

Environmental Tracking System

- The primary tool used to track the Environmental clearance process is the Environmental Tracking System (ETS), which is a mainframe legacy system. Though ETS contains information related to a project's environmental status, the tracking and reporting capabilities could be strengthened to provide more useful management information to the Districts. For example, the system does not track turnaround times for internal and external reviews.
- Due to the restricted capabilities of ETS, many Districts are utilizing parallel project tracking applications that have been internally developed at each District.
- There is a lack of consistency among the internally developed tracking systems used by the Districts. Each District has implemented its own method of tracking environmental clearance schedules, which range from white boards to simple spreadsheets and comprehensive computerized scheduling tools which track all aspects of a project's schedule.
- Several years ago, TxDOT implemented a pilot program for submitting environmental project documentation electronically through ETS for review. This program was abandoned for several reasons including electronic formatting difficulties, lack of appropriate supporting equipment such as color scanners, and difficulties associated with firewalls. In addition, external agencies such as the FHWA requested that only hard copies be submitted for their review process. Districts are now required to send in ten (10) hard-copies of documentation to the Environmental Division.

Environmental Scheduling Process

The environmental process is typically on the critical path to project letting and environmental schedules are set to meet letting dates. Meeting letting dates is the Districts' main priority.

- The categories of required environmental clearances and time associated with obtaining approval vary by project. Blanket Categorical Exclusions (BCE) are the simplest and can be cleared in a matter of weeks or months whereas Environmental Impact Statements (EIS) are the most complex with a process that can span years.
- Environmental Division has posted on ETS, the general best case scenario timeframes required to obtain clearance by category assuming no unusual or significant issues.
- The Districts primarily base their environmental schedules on the high level guidelines provided by ETS, the complexity of the project and/or on experience with historically similar projects.
- Updates to the environmental schedule are performed periodically and the frequency of updates

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

can range from monthly to yearly. In many instances these updates are done at cross-functional meetings within the Districts in an effort to keep other groups apprised of the current status of a project.

- In general, most Districts we interviewed do not track historical clearance process timelines to aid in the scheduling of future projects.

Interaction with Division

- Ineffective communication channels between District and Division can be a source of additional delays during the clearance phase.
    - During the course of our interviews, concerns were expressed regarding turnover of staff within the Districts as well as the Division which has resulted in a lack of continuity and increased inconsistency related to the level of documentation detail necessary for an environmental submittal. With each change in personnel comes a slightly varied interpretation of the clearance requirements.
    - Concerns were also raised regarding slower than anticipated turnaround times for approvals from the Division.
- The Districts believe that, in some instances, Division is more stringent in their interpretations than the actual regulatory agencies. This in turn decreases the control the Districts have over the process and increases the time necessary to receive clearance due to multiple interactions and submittals with Division personnel.
    - According to our interviews, in certain instances the Environmental Division may request non-required supporting documentation prior to granting approvals.
    - For example, there are checklists for categorical exclusions which have been distributed to the Districts to serve as guides in preparing appropriate documentation. Though the completion of these checklists for BCEs and Programmatic Categorical Exclusions (PCEs) are not mandated by Division, Districts have been asked on numerous occasions, to submit these checklists to Division for review. The Districts would like more standardization in the supporting documentation required for these types of submittals. They would also like more authority in the processing of these clearances with Division maintaining the right to audit the Districts to ensure compliance.
    - Based on our interviews, in some instances Districts were required to provide support for impacts related to certain species not currently on the 'Endangered List'.
- The Environmental Division is currently re-writing and updating its manual to make it more of a "how to" guide.

Interaction with External Regulatory Agencies

- According to our interviews, accurately estimating the time to allocate for external reviews such as United States Army Corp of Engineers (COE) permits, Parks & and Wildlife and FHWA is particularly difficult for the Districts. This is due to the inconsistent turnaround times on comments for documentation submitted for review. The inconsistent turnaround times may be in part due to the significant turnover of personnel at the external agencies.
    - This may cause significant delays in the environmental clearance process.
    - Historically, the COE permitting process has been an especially lengthy process.
- The current policy employed by the Districts to mitigate delays on projects due to external

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

reviews is to submit the necessary documentation as early as possible.

- Memorandums of Understanding (MOU) that set specific turnaround times have been implemented with several agencies in an effort to expedite the process. However, the Districts we spoke with indicated they typically wait to receive the actual clearance because the MOU does not relieve the District of risk if there is an environmental issue related to the project.

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

Impact:

Inconsistent and ineffective tracking and schedule controls on the environmental process increases the risk of delaying the project development and construction letting schedules. Without enhanced scheduling controls, TxDOT may not effectively identify potential issues early in the environmental process such that proactive schedule mitigation strategies can be developed. Moreover, without evaluating the current processes for streamlining opportunities, the environmental schedule may be subject to unnecessary delays.

Operational Strengths / Leading Practices:

All Districts recognize the environmental clearance area as a critical path element for the successful and timely construction letting of a project. In order to address this issue, several Districts have created scheduling systems to expand the current capabilities of Division resources. Some strengths and leading practices are:

- District personnel have created tracking and performance applications aimed at collecting and analyzing information from various sources to facilitate identifying and mitigating issues such as delays and impediments at the District level.
- Certain Districts have created specialized scheduling tools to track the environmental clearance process, including management of consultants and other external agencies. Customized scheduling applications range from simple spreadsheets to comprehensive databases and fully integrated custom programs, some of which integrate seamlessly with project scheduling tools.
- One District in particular has an internal Standard Operating Procedure that sets forth the process to obtain environmental clearance one year prior to the scheduled letting date. In the last six years, this District has only missed one letting date due to delays in environmental clearance. Operational strengths include:
    - Comprehensive reviews of documentation by consultants and two TxDOT personnel before submitting to Division for approval.
    - Collecting and disseminating comments received by Division and external agencies to entire department to ensure omissions or errors are not repeated in future documentation.
- Districts actively seek additional expertise from Division, which helps address issues at an earlier stage and avoids reiterative submissions, and, albeit more infrequently, also seek additional expertise from other Districts.
- Only one of the Districts interviewed follows the timing outlined in the MOUs and proceeds with the project scope if comments have not been received by the due date. They do, however, accommodate any comments after the due date to the best of their ability.
    - On environmentally sensitive projects, this District may choose to wait for comments. This is particularly true when dealing with the COE.

Industry Practices

Based on research and experience we have identified the following leading practices adopted by other DOTs:

- Creating databases which track projects and their major milestones. This helps establish a

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

method to assure consistency in statewide environmental information.

- Implementing internet-accessible interactive database tools and including information that provides in-depth reports, access to current and archived performance information, and links to performance topics published to date.
- Developing handbooks that include summaries of environmental requirements and best practices. This ensures that staff complies with Federal and State environmental regulations.
- Recognizing the need to solicit feedback from resource agencies to gain their confidence while making sure that environmental commitments are implemented.
- Issue-specific and process-wide approaches have been developed through interagency cooperation to promote successful and efficient project development during the environmental process.

Conclusion / Recommendation for Improvements:

- The variations in scheduling philosophies and applications between the Districts result in differing levels of effectiveness in tracking projects. A more consistent, timely and rigorous process for verifying project information during the project life cycle results in more accurate forecasting of project timelines, project costs and ultimately, project letting dates. Improved tracking, scheduling and reporting tools would further increase the accuracy of project forecasts as well as to provide higher levels of accountability.
    - To improve the execution of the environmental process, TxDOT should develop enhanced scheduling controls to monitor the environmental process. Developing more detailed scheduling controls could help to improve communication and accountability both at the Districts and the Division. Enhanced scheduling controls could monitor internal as well as external handoffs and the durations associated with each of the key activities. Historical durations for specific activities could then be utilized to develop realistic durations for future planning purposes. For complex projects, there is opportunity to utilize a Critical Path Management (CPM) scheduling tool as described in the Planning section of this report to track environmental progress. Such a scheduling tool could be utilized to update progress and project the anticipated completion dates.
    - Both the Districts as well as the Division should be held accountable for missed letting dates. This will encourage the Division to work with the Districts to solve environmental challenges and successfully achieve letting dates.
- As its technological resources improve, TxDOT should continue to evaluate the potential for sharing environmental documentation electronically. Benefits associated with the strategy may include faster communication between the Districts and the Division, increased ease of storing documents electronically, and increased ease of electronically tracking changes, i.e. revision searching capabilities and electronic comment tracking. Prior to implementation, TxDOT should ensure it has the proper IR and administrative supporting resources for processing documents electronically.
- Examine and incorporate leading practice scheduling processes utilized by the Districts to generate consistent and efficient procedures on a state-wide basis. The leading practices should include:
    - Collection and dissemination of historical environmental clearance timelines to determine accuracy of ETS timelines, or aid in the implementation of more accurate

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

timelines for future projects;

- Inclusion of project specific or unique requirements that might not be addressed in set guidelines; and,
- Standardization of key milestones based on the category of clearance.

- The Environmental Division should continue to enhance training to achieve consistency in interpretation of regulations and processes. External agencies could also continue to be involved in assisting TxDOT with interpretation of certain 'grey areas' within regulations. This will help to clarify the process and the submittal requirements of the Districts and could potentially reduce reiterations and re-submittals of documentation. Communicating clear expectations between both the Division and the Districts will help to ensure a clear understanding of requirements and procedures.
  - The revised environmental manual, currently being developed, is expected to help clarify some of the interpretation and procedural issues. The Environmental Division is also developing competency tests for training modules to help ensure employees and consultants are qualified for performing environmental work.
- TxDOT should create consistent review procedures at the Division level based on well defined policy standards. To account for loss of institutional knowledge due to turnover, the procedures and standards should be well documented and communicated to ensure compliance from newer personnel. The revised environmental manual should help to strengthen the procedures and policy standards.
  - The revised manual should include clear procedures for documenting and communicating comments, including any necessary references to regulations. It may also be beneficial to designate required changes versus suggested changes.
  - The adequacy of the QA/QC procedures currently being utilized by the Districts to review environmental documents should be evaluated and any necessary procedural changes should be included in the revised manual. There is opportunity to share the operational strengths, as discussed above, across the state to improve quality of environmental documentation. Comprehensive reviews of documentation by consultants and TxDOT personnel before submitting to Division for approval could help to strengthen the QA/QC process. Also, collecting and disseminating comments received by Division and external agencies to the entire District department could help to ensure omissions or errors are not repeated in future documentation.
- TxDOT should coordinate more closely with external review agencies to ensure adherence to MOUs, or the Districts should follow the timing outlined in the MOUs and proceed with the project scope if deadlines are missed. Any root causes for missed deadlines should be communicated and properly addressed to help improve the process going forward.
  - Districts that wait for comments regardless of lapses in deadlines should then include sufficient additional time in their schedules to account for delays due to external reviews.
- Additionally, external agencies should continue to be involved in TxDOT's efforts in researching and discussing alternative solutions to help speed the review process. MOUs have helped to establish review procedures and improve schedule planning. TxDOT should continue to seek opportunities to establish partnership agreements and develop workable solutions to improve the environmental process.
- TxDOT should consider conducting a cost-benefit analysis to determine the advantages to

1.3 Audit Area: Project Development - Environmental	**1.3.1 Risk:** Development and tracking of schedules during the environmental clearance process

upgrading or replacing the ETS system. A new system to replace ETS could incorporate tracking and scheduling tools that would be used consistently throughout the organization. A representative body from the Districts should be included in the analysis and implementation of a new system to ensure District level requirements are being met.

1.3 Audit Area: Project Development - Environmental	**1.3.2 Risk:** Effectiveness of internal policies and procedures

Background:

During our review, concerns were raised regarding the consistent application and interpretation of environmental policies and procedures both at the Division and District levels. It appears that more time is now required for obtaining environmental clearance not only due to changes in laws, policies and procedures and heightened sensitivity to risk but also because of potentially less experienced internal and external reviewers may negatively impacting the amount of time required for attaining environmental approval. This increase can lead to delays in project development, delays in the letting process and cost increases.

Observation/Findings:

Interpretation of Regulations

- As mentioned in the scheduling section of this risk area, Districts believe that in some instances Division is more stringent in their interpretations than are the actual regulatory agencies which in turn places greater uncertainty on the clearance process at the District level and increases the effort necessary to receive clearance.
- Districts indicated that turnover of staff in the Division has generated inconsistency in interpretation of requirements to be met for a submittal. The requirements can vary for each District, or within a District, based upon the person that is performing the review at Division.
- Districts believe that the interpretations of some internal policies provide a degree or range of leeway to the Districts. However, in many instances the District's interpretation of these "grey" areas differs from the Division's interpretation. From a District perspective they would prefer to have the autonomy to make these decisions. In the event that the Districts are not allowed this freedom, they would prefer to have the requirements completely detailed in order to reduce re-submittals.
- Division is viewed by the Districts as being overly risk-averse in dealing with environmental issues. The different perceptions of risk tolerance between the Districts and the Division can contribute to length of time required to achieve Environmental clearance.
- Currently, there is no formal process for establishing detailed internal policies. In many instances, Division does not solicit District input on internal policy changes. Districts expressed concern that the top-down implementation sometimes utilized by Division does not fully value the perspective and involvement of the Districts and therefore, expectations may not be aligned during new policy implementation at the District level.
    - Historically, policy changes were communicated with Districts first in draft format and Districts were given an opportunity to comment on changes. A final policy change was then implemented after addressing Districts' concerns. Currently, Division seeks feedback regarding new policy on an informal basis primarily from the Districts most familiar with the particular issue at hand.
- The Environmental Coordinators Conference is a primary vehicle for introducing new policies to the District personnel; however, the conference has recently been changed from an annual event to a biannual event.
- There are resources such as the Project Development Manual and intranet resources that provide formal procedures and policy for the environmental process. However, during the course of our interviews, Districts indicated that in certain instances some of the smaller, less significant policy or procedural changes are communicated informally to the Districts via email

1.3 Audit Area: Project Development - Environmental	**1.3.2 Risk:** Effectiveness of internal policies and procedures

or verbal communication. As a result, Districts sometimes fail to notice the informal communication on changes in requirements leading to re-work.

Other Policy and Procedural Issues

- Districts have suggested that TxDOT adopt concurrent reviews by Division and external regulatory agencies, specifically the FHWA. This way, Districts could address comments received by Division and the regulatory agencies concurrently in an effort to reduce the time required to obtain environmental clearance. The Division has explored the option of conducting concurrent reviews; however, it appears that concurrent review submissions suffered from poor quality issues. Division is working to develop a QA/QC review process and Standards for Submission to improve these issues.
- The use of consultant contracts has benefited the Districts by helping them meet project demands. However, some internal policies prevent the full utilization of these benefits:
    - If Environmental Consulting Services are included within an overall design contract, the process of hiring the consultant is much simpler and quicker than if a consultant is retained under an environmental services contract.
    - The reduction in the consultant cap level for evergreen contracts from five million down to two million dollars has created additional review, submittal and time requirements for developing contracts from the District's personnel. In addition, Districts expressed concern regarding the depth of expertise and resources provided by smaller firms versus the larger firms.
- An internal issue escalation process does not exist to address disagreements between the District and Division. This can lead to inconsistent and incomplete resolution of environmental issues. Division is currently working to develop a process for escalating disagreements.

Impact:

Inconsistent interpretations of the environmental policies and procedures may expose TxDOT to additional scheduling risk and delays due additional work associated with re-submittals.

Operational Strengths / Leading Practices:

Based on research and experience, we have identified the following leading practices adopted by other DOTs:

- Creating a sourcebook that identifies the various environmental laws and regulations that typically affect transportation projects, describes the framework for environmental resource assessment, and explains how resource assessment is integrated in to overall project development process.

Developing standard environmental reference resources, some web-based, to help state and local agency staff plan, prepare, submit and evaluate environmental documents.

1.3 Audit Area: Project Development - Environmental	**1.3.2 Risk:** Effectiveness of internal policies and procedures

Conclusion / Recommendation for Improvements:

- Standardize environmental review requirements at the Division level to eliminate inconsistent review of District submittals. In addition, distribute a formalized checklist of requirements with detailed explanations for the Districts to decrease the possibility for re-submittals. Division is currently developing checklists; however, their completion has been delayed due to heavy workloads and resource constraints.
- Defining requirements and interpretations in clearing categorical exclusions and addressing "grey areas" would help in streamlining the review process and alleviating some of pressures associated with submittals to Division.
- Solicit more frequent input from the Districts in regards to potential policy changes as well as interpretations of current policies. Feedback and communication between the Division and the Districts should be strengthened to identify procedural impediments in the environmental process and work to resolve the contributing issues. Increasing the level of District input in policy making and procedural reviews can further strengthen this relationship and create additional efficiencies in the environmental process. Create an intra-District team or counsel composed of various members from different Districts to review and comment on proposed changes.
- To improve the process time required for environmental submittals, TxDOT should also explore the potential for implementing a concurrent review approach that includes simultaneous review by external agencies such as FHWA and EPA along with Division. The Environmental Division has previously explored the option of conducting concurrent reviews; however, it appears that concurrent review submissions suffered from poor quality issues and that anticipated process improvements were not achieved. Division is currently working to develop a QA/QC review process and Standards for Submission to be implemented at the Districts to improve accountability and the quality of environmental submittals to Division. Once these quality issues have been addressed, TxDOT should continue to explore the potential for a concurrent review process. This could be performed on a trial basis, where in specific types of documents are sent for concurrent review.
- To improve quality of submittals TxDOT should consider having District management sign-off on significant environmental submittals. Implementing this process could also help to improve accountability.
- TxDOT should continue to enhance and encourage environmental training at both the Division and the Districts to achieve consistency in interpretation of regulations and processes. This will help to ensure the Districts are receiving consistent guidance and that approval criteria are being consistently implemented. TxDOT should consider instituting a formal, mandatory training system to track and monitor learning progress of its employees. Strengthening the training programs could improve quality of submittals and develop a common understanding of regulations and procedures. Numerous courses on environmental policies and procedures are already available to TxDOT employees.
- Communication between the Division and Districts should be improved to help ensure that the expectations associated with the policies and procedures are clearly defined and to develop a common understanding of the environmental roles and responsibilities at all levels of the organization. TxDOT should consider reinstituting the annual environmental meeting, as opposed to a biennial meeting, to allow environmental personnel from Division and the various Districts to meet on a regular basis to improve communication, discuss common challenges or issues and identify potential solutions.

1.3 Audit Area: Project Development - Environmental	**1.3.2 Risk:** Effectiveness of internal policies and procedures

- Reexamine the evergreen consultant contract requirements including the $2 million cap. Revising the requirements could eliminate some of the time and effort involved in selecting a potential consultant as well as contracting with them. With a larger contracting cap the consultant procurement process would not need to be performed as frequently.
- Implement a formal review process to address complaints and issues raised by the Districts. Provide feedback and resolution to the District in regards to the issue. Division should continue to develop the internal escalation process which it has already started.
- Although internal policies and procedures are essential in ensuring compliance with regulatory agency requirements, some internal policies based on stringent interpretations of regulations may have created additional and unnecessary work for the Districts and for Division.
    - TxDOT should consider implementing a cost-benefit approach in determining appropriate risk levels. Some level of risk may be tolerable and reasonable when the corresponding costs associated with its elimination are considered.
    - The Division and the Districts should develop a common understanding of risk and collectively determine the appropriate risk tolerance with regard to interpreting policies and approval requirements. The approach and risk philosophy should be effectively communicated to both the Division and the Districts.

1.3 Audit Area: Project Development – Environmental	**1.3.3 Risk:** Sharing environmental resources, leading practices and experience between Districts

Background:

Numerous Districts are experiencing challenges with the environmental clearance process. Based on discussions, some Districts believe that they have a better understanding of the clearance process and have developed District specific internal methodologies that have been successful in mitigating delays. Currently, there is no formal process for Districts to readily share this knowledge and experience.

Observation/Findings:

We interviewed District Engineers, TP&D Directors, District environmental supervisors and Area Engineers to discuss their environmental operations resulting in the following observations:

- Sharing of information between Districts is infrequent.
- Current sharing opportunities consist of the following:
  - Statewide conferences and meetings;
  - Professional group meetings;
  - Personal relationships; and,
  - Division recommendations.
- Sharing is more likely to occur regionally than on a state-wide level.

Impact:

Not having a single platform for Districts to share experiences, challenges, lessons learned and best practices causes all Districts to 're-invent the wheel' while dealing with impediments that other Districts might have already encountered and resolved. In a resource constrained environment, not sharing resources across Districts causes an inefficient utilization of TxDOT resources.

Operational Strengths / Leading Practices:

The most effective distribution of information currently occurs through a network of personal relationships.

- The existence of societies, learning opportunities and conferences are prime channels to function as distribution networks of information.
- Established personal relationships are key to being able to effectively distribute and implement improvements.

The Environmental Division publishes a periodic newsletter called "ENVision." This newsletter was developed in 1995 and has published 30 editions since then to distribute information.

Industry Practices

Presentations and handout materials are placed on a web site to allow continued use of these materials and information

1.3 Audit Area: Project Development – Environmental	**1.3.3 Risk:** Sharing environmental resources, leading practices and experience between Districts

Conclusion / Recommendation for Improvements:

By finding ways to effectively distribute information between Districts, the common sources of delays can be identified and mitigated during the clearance process. As this portion of the overall project is critical to its successful completion, any beneficial process discovered by one District needs to be quickly and effectively distributed to all Districts. Areas to consider include:

- Focus on distributing information, starting with intra-District, neighboring Districts, Regions and concluding with statewide distribution.
- Consider creating a web based application that could warehouse historical information, best practices, solutions to unique impediments and other environmental information. Access to such information may better prepare Districts to understand requirements, study historical cases, identify solutions and prepare accurate and complete documentation for submittal.
    - This web based application could be supplemented with the distribution of information via regular correspondence such as monthly emails or newsletters. An email distribution could also be used as means for soliciting feedback from the Districts on key issues.
- Focus should be given to teaming and to improving efficiencies statewide and not just within each District.
- Create more instances for personal networking to establish more cross-District and Division interaction and relationships. Open communication between Districts and Division will help educate District personnel on Division's perspective on regulations, risks and requirements. Similarly, Division personnel will be able to understand challenges faced by the Districts. Districts should also be educated on the roles and responsibilities of the Division to gain a better understanding of the tasks performed at the Division level.
- Establish a follow-up mechanism to determine if recommendations are implemented and to analyze what their impact on the environmental process.
- Create more interactive conferences or meetings that focus on brainstorming solutions to commonly encountered issues. These could include interactions with external reviewers in an effort to establish relationships and to better understand working viewpoints. TxDOT should continue to conduct quarterly meetings with FHWA at different locations throughout the state. TxDOT should market these events internally and encourage environmental District personnel to attend.

1.3 Audit Area: Project Development - Environmental	**1.3.4 Risk:** Employee recruitment and retention

Background:

Changes in regulatory policies and procedures have resulted in increased work requirements and time needed for environmental approval. Therefore, some Districts have experienced issues with having adequate, well qualified personnel to manage contracts and oversee the environmental process.

Observation/Findings:

- Salary compensation is deemed to be not competitive when compared with the private sector. Benefits help to close this gap but many people are not aware of or do not consider the overall benefits package when comparing compensation.
- Turnover of staff in Division as well as the Districts has generated inconsistencies among new recruits with respect to the requirements of the environmental clearance process. Recent adjustments to the salary structure have helped in the retention of personnel.
- Districts have had some difficulty in recruiting qualified personnel.
- Training opportunities are extensive and comprehensive. Division solicits input from Districts on the type of training that should be offered, which helps to align the educational program with the needs of the Districts' staff..
- The professional work experience achieved by personnel is well rounded and extensive. This in fact makes employees more desirable to the private sector.
- The 11:1 supervisor ratio appears to limit the career path of many employees. As people get further along in their career at TxDOT they are less likely to leave for the private sector. This increases retention at higher levels but it also limits the opportunities for junior level personnel. The lack of supervisor roles and intermediate level managers results in the belief that people have to go to the private sector in order to continue to advance their careers.

Impact:

Significant turnover as well as untrained and inexperienced staff creates inefficiencies within the environmental clearance process, thus delaying or even missing the letting schedules for projects.

Operational Strengths / Leading Practices:

TxDOT has received high marks from all Districts in regards to its wide array of training opportunities from educational to professional arenas. Maintaining this program while expanding in other areas, such as mentoring, should increase employee satisfaction and retention.

- Annual surveys conducted by the Districts and division provide opportunities to address District needs and improve employee expertise.
- Several Districts have implemented comprehensive mentoring programs. The goal of these programs is to ensure that there is a line of succession in-place as more senior personnel leave TxDOT. In addition, it provides junior personnel with a better understanding of the growth potential within TxDOT.
- Societies comprised of junior level personnel have the benefit of being run for junior personnel by junior personnel. This allows open interaction and sharing of common issues.

1.3 Audit Area: Project Development - Environmental	**1.3.4 Risk:** Employee recruitment and retention

- Societies could be expanded to serve as representative bodies to an all encompassing District council set up to address Area Office and District employee questions and concerns.

Conclusion / Recommendation for Improvements:

As a public entity, salary expectation is typically lower for TxDOT employees than for equivalent positions in the private sector. As a counter balance, the additional benefits received significantly close this gap. That being said, many employees still tend to focus on the issue of salary as an area of improvement. Areas to consider include:

- Benchmark salary and benefits to equivalent positions within the private sector and make adjustments in areas where there are significant discrepancies. One District we interviewed is already benchmarking compensation for engineers within their District and the private sector. This could be expanded to include all fields and all levels of personnel.
    - Annually report the findings of the benchmarking study to further illustrate and emphasize the desirability of the overall compensation package offered by TxDOT.
- Develop unique programs to recognize employees at all levels for outstanding performance both internally and externally. Share ideas for employee appreciation between all Districts.
- Provide project specific recognition to employees with significant contributions to successful projects that have been completed on-time and under budget.
- Continue to offer extensive training opportunities as well as comprehensive and varied work experiences. Expand the job rotation program to include District/Division exchanges of personnel as well.
- Create an active mentoring program to assist in guiding junior personnel through their careers. This would include working with high achieving junior level employees to identify and illustrate job growth opportunities.
- Conduct employee surveys to determine areas of improvement. Distribute the survey results and communicate the steps being taken to rectify the issues.

1.4 Audit Area Project Development – Right of Way

1.4 Audit Area: Project Development – Right of Way	**1.4.1 Risk:** Development and tracking of ROW acquisition costs and schedules

Background:

The Right-of-Way (ROW) acquisition process is affected by a number of variables including economic trends, political factors and legal disputes. The ROW acquisition process can be especially difficult to manage for Districts experiencing strong economic growth and increasing population. However, less populous Districts have also experienced difficulties in successfully completing the complex ROW process in a timely manner. In addition, it appears that an increased aversion to risk has lengthened the duration of the ROW acquisition process in recent years, contributing to a rise in project costs. We identified this as a potential risk pertaining to the Districts' ability accurately and consistently estimate, schedule and manage the ROW and utility relocation processes to avoid delays and cost overruns on projects.

Observation/Findings:

- ROW issues, along with environmental clearance, are traditionally critical path activities affecting the overall project duration during the project development phase. The start of the ROW process is constrained by the environmental process and ROW acquisition cannot begin until the environmental process is cleared.
    - Certain Districts begin the mapping process while environmental clearance is being obtained. This exposes the Districts to a certain degree of risk because the ROW property may need to be adjusted based upon environmental changes; however, these Districts have accepted the risk in order to expedite the project schedule. The Districts believe performing the ROW services in parallel with environmental clearances is an effective and efficient strategy.
- Utility relocations can cause significant delays in the ROW acquisition process. Utility companies must be notified early in the ROW process so they can allocate funds for the relocation into their fiscal budget. This requires a notification period of approximately one to two years ahead of the project letting schedule. Typically, utility relocations account for 10-40% of total ROW costs.
- Estimating the time required to obtain ROW can be difficult. ROW parcels that require Eminent Domain hearings can delay acquisitions by years. Final acquisition costs for Eminent Domain parcels are subject to the discretion of publicly elected officials and costs can increase substantially over original estimates. In addition, due to the appeals process, final closing of the parcels could be years after project construction. According to the District, approximately 10 to 25% of parcels go in to the Eminent Domain process.
- Interaction between District offices and Division can also extend the duration of the acquisition phase.
    - For example, the Districts must obtain approval from Division to purchase property above the appraisal value. This adds time to the acquisition process even for small or low value properties.
    - Another example of extending the duration of acquisition relates to the condemnation process. Documentation related to condemnation must be processed through Division and receive a Minute Order from the Commissioners as well as the Attorney General's Office. Due to limited availability for obtaining the Commissioners' approval, this process often extends the duration of the ROW process.
- During our interviews, the District personnel expressed concerns regarding the staffing

1.4 Audit Area: Project Development – Right of Way	**1.4.1 Risk:** Development and tracking of ROW acquisition costs and schedules

constraints at the Division level. District personnel were satisfied with the support received from Division, given the extent of Divisions resources; however, the Districts also suggested that Division's support and timely feedback could benefit from obtaining additional staff as well as having more experienced staff.

- The use of consultants is effective in expediting the process of obtaining ROW information from the Districts. This is primarily due to the large number of active projects versus the limited number of FTE's available to work on these projects. Consultants are especially effective for very large or complex projects and carry a significant portion of the Districts work load. In addition, the perception at the District level is that the use of consultants by Division for reviewing submittals would shorten the review and approval process.
- ROW schedules are set according to the District's letting schedule. Meeting the letting date is the District's main priority.
- Legacy computer application systems such as the Financial Information Management System (FIMS) and the Right of Way Information System (ROWIS) contain information related to a project's ROW status. However, neither of these applications contains sufficient tracking and reporting capabilities to effectively enable the Districts to manage the detailed ROW process. This has led to many Districts utilizing parallel project tracking applications which have been developed internally and separately from other Districts.
- There is not a consistent tracking system used on a statewide basis. Each District has implemented its own method of tracking ROW schedules.
- Updates to the schedule are performed periodically and are generally completed quarterly or bi-annually depending on the complexity of the project. In many instances these updates are done at cross-functional meetings in an effort to keep other groups informed of the current status of a project.
- ROW acquisition estimates are based on numerous factors including historical cost information, sales comparisons, tax assessor information and experience. These factors are used to create a baseline estimate for ROW. Original cost estimates are typically updated bi-annually; however, Districts do not reconcile the original forecasted amount to the final actual amount.

Impact:

Inconsistent and ineffective schedule controls for ROW compromise financial planning and increase the risk of escalating costs due to delays. Moreover, without identifying, mitigating potential delays and reevaluating the overall risk of the current ROW process, projects may not meet their letting schedules as a result of lengthening acquisition timeframes.

Operational Strengths / Leading Practices:

Districts recognize ROW acquisition as a critical item for the successful and timely letting of a project. In order to address this issue, several Districts have developed scheduling and monitoring models that aid in the management of ROW schedules and District resources. Areas to consider include:

- Some Districts have the capability to develop software applications aimed at solving issues that emerge during the ROW process at the District level and have shared these applications with other Districts. For example, one Metro District has developed a custom program that is integrated with Primavera Scheduling software to help track and monitor the ROW acquisition

1.4 Audit Area: Project Development – Right of Way	**1.4.1 Risk:** Development and tracking of ROW acquisition costs and schedules

process as well as overall project development.

- Certain Districts are beginning the ROW mapping process during the environmental clearance phase. This strategy has been applied in an attempt to refine ROW procedures and streamline the acquisition process.
- Some Districts have created schedule tracking spreadsheets and timelines to monitor the turnaround times between District personnel, outside consultants, and Division personnel.

Industry Practices

Based on research and experience we have identified the following leading practices adopted by other DOTs:

- Creating multi-disciplinary teams, including Right of Way and Utilities, who review plans at key completion milestones during the final design process in order to timely assess and resolve any developing problems.
- Identifying and evaluating the impact of proposed design on existing utilities and considering alternative designs based on cost-benefit analyses.
- Creating a process that considers all possible solutions or settlements prior to initiation of condemnation and considering the use of mediation to settle certain parcels that may reduce the cost and time associated with the eminent domain process.
- Authorizing decision-making at the lowest effective level to reduce time associated with the approval process.

Conclusion / Recommendation for Improvements:

The various scheduling philosophies and tools used throughout the Districts result in differing levels of effectiveness regarding tracking projects. A more consistent, timely and rigorous process for verifying information during a project's life cycle would result in more accurate forecasting of project timelines, project costs and project letting dates. Developing detailed and standardized scheduling and reporting tools would further increase the accuracy of project forecasting as well as provide higher levels of accountability. Areas to consider include:

- Evaluate and incorporate leading practices regarding scheduling processes used by Districts to generate quality and consistent scheduling controls. Establish appropriate review timeframes for project schedules and cost estimates both at the District and Division levels. Developing a Standard Operating Procedure defining the timeframe expectations for reviews and approvals would streamline the process and improve accountability. In addition, by tracking baseline schedules and costs against current estimates and progress, TxDOT can develop performance measures to monitor ROW execution and improve accountability.
- Allow Districts to begin contacting title authorities at an earlier date to expedite the ROW schedule. Enabling Districts to begin this process earlier will enable them to anticipate potential issues with ROW acquisition. This will allow the District to mitigate risk associated with parcels that may require special attention and/or additional time to process. This strategy may not be required for all projects and will depend upon the urgency and anticipated risk associated with a particular project. TxDOT should develop appropriate guidelines and controls to manage the implementation of this strategy.
- Implement a cost-benefit approach in determining appropriate risk levels associated with ROW acquisition. Some level of risk may be acceptable when the corresponding costs associated with delaying a project's letting outweigh the benefit gained from removing risk entirely. TxDOT

1.4 Audit Area: Project Development – Right of Way	**1.4.1 Risk:** Development and tracking of ROW acquisition costs and schedules

should revisit their current ROW policies and associated risk tolerance.

- Explore the potential for delegating more authority to the Districts for negotiating land value. A ROW task force is currently examining the potential for delegating more authority to the Districts. The task force should consider allowing Districts to purchase parcels above the appraisal value because it may help to streamline the ROW process. Division could establish controls for this policy, yet still provide the Districts with more flexibility and autonomy. For example, the Division could grant the Districts authority to purchase parcels at certain percentage above the appraisal cost.
- Examine the possibility of implementing a consultant contract within Division as well as within the Attorney General's Office. Due to staffing constraints at Division as well as the Attorney General's Office, supplementing their workforce with consultants would improve the time required to expedite reviews and approvals and would expedite the Eminent Domain process.
- Enhance internal communication between Division and Districts to improve the ROW scheduling process. Incorporating all functions for feedback can further refine the overall schedule.

1.4 Audit Area: Project Development – Right of Way	**1.4.2 Risk:** Efficiency of Sharing ROW Resources

Background:

The availability and needs for ROW personnel resources are dependant upon the number of projects in a District's pipeline, the size of the projects and the timing of the projects. Some Districts have borrowed ROW personnel from other Districts to help with their ROW process for major projects. However, there is no system established for identifying available ROW resources or needs across the organization. There is a risk of inefficiently using the already limited resources within TxDOT.

Observation/Findings:

- The most common method for communicating personnel needs or availability currently occurs through a network of personal relationships. Department managers or project managers may express needs to their counterparts in other Districts through informal communication such as email or phone. This form of resource sharing typically occurs on a regional basis.
- There appears to be no formal system for communicating resource sharing opportunities across Districts. Many Districts are outsourcing more work to help manage their growing work load.
- Information regarding leading practices or lessons learned is shared informally across Districts.

Impact:

Not establishing a formal system for identifying available ROW resources or specialized skill sets across Districts can create inefficiencies in FTE utilization. The ROW Function is critical to the project development process and improper allocation of resources could result in delays to or failure to acquire all necessary ROW and result in delays to the letting process and increased costs.

Operational Strengths / Leading Practices:

- Established personal relationships have proven to be beneficial in effectively communicating resource needs as well as information regarding leading practices. However, personal networks may provide limited information based upon the size of the network. In addition, employees must take the initiative to share information and/or resources.
- Many public and private sector organizations have incorporated formal procedures or mechanisms for communicating resource needs and availability. In some instances, this includes developing a resource manager role to evaluate resource sharing opportunities.

Conclusion / Recommendation for Improvements:

- TxDOT should consider developing a formal system for communicating ROW resource needs and availability to more effectively level resources and improve productivity on a statewide basis. Implementing a system or process within the HR or ROW department for monitoring resource sharing opportunities would help to achieve this goal.
- Effectively sharing information between Districts will facilitate identifying common ROW issues being faced by multiple Districts. Lessons learned and leading practices should be shared to improve ROW processes and procedures. Areas to consider include:
    - Sponsor formal and informal communication with external reviewers in an effort to establish relationships and to better understand working viewpoints.

1.4 Audit Area: Project Development – Right of Way	**1.4.2 Risk:** Efficiency of Sharing ROW Resources

- Distribute information via regular correspondence such as monthly emails.
- Facilitate more interactive conferences or meetings that focus on brainstorming solutions to commonly encountered issues.
- Develop IR resources such as email groups or websites to foster sharing leading practices.

2.0 Project Delivery

2.1 Audit Area Project Delivery – Comprehensive Development Agreements

2.1 Audit Area: Project Delivery - Comprehensive Development Agreements	**2.1.1 Risk:** Effectiveness of CDA management and oversight

Background:

Comprehensive Development Agreements (CDAs) are a relatively new contracting development and delivery model that TxDOT has begun to utilize to develop, design, construct, operate, maintain and/or finance transportation facilities. Traditionally, TxDOT has delivered projects using the design-bid-build model (DBB) which is favored by public entities, particularly DOTs. The three primary types of CDAs used by TxDOT are Design-Build (DB) Agreements, Pre-Development Agreements and Concession Agreements. TxDOT provides oversight for CDA projects and it may retain consultants to help with it's oversight responsibilities. The oversight team helps to facilitate procurement, construction and operation of the new project and may also provide independent quality verification for design and construction. As a development and delivery methodology, CDAs at the District level can impact project development functions, project delivery functions and support operation including design, construction, maintenance and finance. The public perception that TxDOT is selling transportation to foreign entities has been a significant challenge to TxDOT and TxDOT would benefit from improving its Public Relations image and public understanding of the CDA process.

The Deloitte FAS team evaluating Auditable Unit B, Contracting and Project Delivery, will be providing more detailed findings and recommendations related to CDAs from the Division perspective.

Observation/Findings:

District Management and Oversight Roles and Responsibilities

- The Texas Turnpike Authority (TTA) Division is the lead entity in the CDA process and administers the process during solicitation and procurement and negotiation, while the Districts provide support and input to develop the project and respond to local issues.
    - Finance Division manages the financial contracts and uses the baseline schedule and revenue estimates to develop the model.
    - Office of General Counsel (OGC) coordinates the law contracts.
    - TTA Division develops the Traffic & Revenue Contract and supplies the revenue estimates.
    - TTA Division also coordinates the Procurement Engineering Contracts and creates the capital cost estimates and baseline schedule for the project.
    - After the project is awarded, the Districts are responsible for the oversight of project inspection and quality control.
- Only a few Metro Districts have experience with the CDA process. Other Districts were aware of the process, but have no appreciable experience with this project delivery method.
- The basic responsibilities for each District participating in a CDA project include:
    - Ensuring that project-specific information is complete and accurate;
    - Conducting public meetings and interacting with local stakeholders;
    - Obtaining early project approvals;
    - Preparing project-specific specifications; and

2.1 Audit Area: Project Delivery - Comprehensive Development Agreements	**2.1.1 Risk:** Effectiveness of CDA management and oversight

- Design and construction (and maintenance) oversight.

Design Roles

- The District utilizes consulting firms to help prepare the documents, perform value engineering and prepare performance based specifications, contract documents and financial models.
- The Developer has responsibility for the overall design being performed in the CDA process, with monitoring and oversight performed by an Independent Engineer (IE). TxDOT and the Developer work together to identify and select an appropriate IE firm.
- For concession projects, TxDOT and the Developer each pay for half of the IE's compensation. The District is responsible for contract administration of the IE. The IE's roles are limited to:
  - Monitoring and auditing the Developer for reasonable compliance with contract requirements and approved Project Management Plan (PMP);
  - Conducting owner verification testing in accordance with FHWA TA 6120.3; and
  - Performing audit and oversight of the non-compliance points, handback requirements and renewals.
- Environmental is typically performed by the District. While some minor aspects of these tasks could be shifted to a developer, the ultimate responsibility for environmental clearance resides with TxDOT. The ROW work is typically shared between the Developer and TxDOT, or the Developer will perform the majority of the work with oversight from Division.
- In the CDA process, design work is typically being performed simultaneously with construction to expedite the overall process. For example, certain ROW, environmental and design tasks (on separate roadway segments) are all being performed at the same time and sometimes while construction is occurring.

Construction Roles

- Similar to design, the District level is responsible for administering the IE performing oversight of the construction being executed in the CDA process.
- During the construction process the Developer will perform Quality Control and Quality Assurance and an IE will audit these functions.
  - TxDOT has the contractual ability to check the design and construction work, limited to checking that the QC process is being followed.
  - TxDOT (through the TTA) has pre-approved five IE firms and is currently advertising to select and pre-approve five more IE firms. The IE contracts are valued at $25 million each and are a significant change from the typical evergreen contracts.
  - TxDOT monitors various design and construction performance measures each month during project execution.

District Observations

- Relatively few Districts have experience with the CDA project delivery process. Within those Districts, a few of the "star" performing engineers or inspectors are selected to participate in the process.
- Districts expressed the desire to have the opportunity to use CDAs on smaller projects, instead of just "mega-projects."
- TxDOT delegates authority to local organizations, such as Metropolitan Planning Organizations (MPOs), at the Districts to prioritize the corridors for work and then TxDOT selects potential

2.1 Audit Area: Project Delivery - Comprehensive Development Agreements	**2.1.1 Risk:** Effectiveness of CDA management and oversight

projects for the CDA process.

- Districts view the private sector funding source (i.e. revenue from the concession and tolls that is distributed to the District) as a necessity to meet their current demand levels for construction and maintenance projects. The Districts perceive some of the benefits of participating in CDAs to be the knowledge gained from observation of cutting-edge construction means and methods and the use of state-of-the-art Information Technology systems for project management.
- A CDA Procedures Manual is currently under development to provide consistency to the approach for delivering projects, to provide guidance for consultant's roles and responsibilities and to allow TxDOT to tailor contract requirements to the goals of the Division, Districts and specific project needs. The CDA processes and procedures have not been fully developed or distributed to the Districts.

Impact:

Since relatively few Districts have been exposed to or have any experience with the CDA process, there is a risk that personnel involved in CDA projects will not have sufficient experience to effectively manage and oversee the CDA process and will not fully understand their oversight role. This includes the District Engineers approving payment and change orders and designers reviewing and approving submittals to field inspectors.

Operational Strengths / Leading Practices:

- TxDOT is successfully managing a DB contract with a Program Management firm. The Program Manager performs its functions as an extension of TxDOT staff, while TxDOT retains oversight of the Program Manager. To facilitate this cooperative effort and to further foster communication, all consultants and TxDOT personnel were co-located to a Project Office. This project is ahead of schedule and under budget.
- TxDOT is in the process of developing a programmatic system and standard technical requirements for the overall CDA program.
- During the past year, TxDOT has conducted several training sessions for the Districts related to the CDA process, including short courses, video conferences and full-day seminars.
- Districts assign inspectors, usually senior personnel, from a cross-section of Area Offices to distribute experience with the CDA process throughout the District.
- The TxDOT DB project team has developed and is effectively using an Inspection Management System (I2MS) to gather, manage, analyze and validate all inspection and other project data. I2MS is a web-based system that performs statistical analysis of testing as required by the Code of Federal Regulations. Some of the other features and benefits of I2MS include:
    - Tracks certifications of the Contractor's inspectors to confirm that only a qualified inspector is testing the appropriate material. For example, only a certified concrete inspector can inspect concrete.
    - The system is linked to inspector PDAs and information is automatically downloaded to the system. The system also uploads any drawing revisions to the inspectors on a daily basis. This reduces human error and helps manage the significant amount of paperwork.
    - The system is linked to some TxDOT and Developer systems.
    - Performs statistical validations of all work.

2.1 Audit Area: Project Delivery - Comprehensive Development Agreements	**2.1.1 Risk:** Effectiveness of CDA management and oversight

- Maintains a history of entries for security.
- Maintains a project history to support any claims or litigation efforts.
- TxDOT owns the system and it can be used on any project.

- The TxDOT DB project team is using File Net software to manage general correspondence and for document control. Documents are scanned into the system which is then searchable.
- The TxDOT DB project team is using Links, a database software system, to manage project photographs.

Industry Practices

- Based on research and experience, state DOTs are using a variety of arrangements to capitalize on private investment and development interest. Some common management strategies being utilized on these types of projects include:
  - Using Construction, Engineering and Inspection (CEI) firms to manage projects.
  - Implementing paperless project management.
  - Establishing a Project Office and co-locating project personnel.
- Leading practices of firms in the private industry are establishing web-based project management offices and are implementing paperless project management.
- Based on research and experience, the construction industry is using Key Performance Indicators (KPI) to benchmark and improve company or project performance. KPIs are common indicators used by executives and project managers to measure performance and to help organizations define and measure progress toward specific goals. They are quantifiable measurements that reflect critical success factors for day-to-day operations, for example productivity. Firms usually set targets for each KPI and establish procedures for collecting pertinent data to measure performance, i.e., quantities installed, labor and cost. KPIs are commonly used to measure schedule variance, project cash flow, change orders, design quality, construction quality, productivity, building prices, project cash flow, cost variances, and safety among others. The benefits of using KPIs include:
  - Benchmarking against industry performance to target improvements;
  - Choosing the better performers using informed data; and
  - Building contracts around incentives based on performance targets.

Conclusion / Recommendation for Improvements:

The alternative project delivery methods created in the CDA process are not the typical design-bid-build process to which TxDOT is accustomed. There needs to be a paradigm shift throughout TxDOT to ensure that the District-level CDA project management and oversight are prepared for the flexibility and speed of construction afforded by the CDA process. TxDOT has taken steps toward developing more structure around the CDA process. The following actions may help to achieve this goal and help to ensure the successful delivery of CDA projects.

- The Deloitte FAS team evaluating Auditable Unit B, Contracting and Project Delivery, have reviewed the CDA process issues from the Division perspective while the following recommendations are from the District perspective.
- Division needs to develop and communicate more comprehensive policies and procedures for

2.1 Audit Area: Project Delivery - Comprehensive Development Agreements	**2.1.1 Risk:** Effectiveness of CDA management and oversight

the Districts' management of CDA projects.

  - Since few Districts have been exposed to or have any experience with the CDA process, TxDOT should continue to implement and expand the internal training programs to educate the CDA approach to the Districts and Area Offices.
  - The Districts will have to make the necessary changes to the organization staffing and management systems to support the policies and procedures as CDAs require a focus on management and oversight roles and prioritization of work during concurrent design and construction.

- Districts should rotate assignments at all levels, including planning, design and inspection, to expose personnel to the CDA process.
- Use lessons learned from executing CDAs and apply them to traditional design and construction business conducted at TxDOT.
  - Research the possibility of incorporating I2MS with Site Manager and implementing web-based project offices and other technology and project automation tools to improve productivity, information flow and document management.
  - Promote the use of the Project Office concept to co-locate consultants and the TxDOT staff for performing oversight functions. This will provide for improved communication among team members and facilitate cross-learning for TxDOT staff.
- TxDOT would benefit from improving its Public Relations image and public understanding of the benefits of the CDA process. Specifically, TxDOT and the Districts should emphasize the needs and benefits of using the private sector funding and or alternative project delivery methods.
- The perception is that CDAs require a concession as part of the agreement. However, TXDOT already uses, and should continue to use, DB, strategic business partnership and other concession models in the CDA process. The CDA process affords a wide range of project delivery methods and contracting arrangements and TxDOT should research implementing other models and alternative contracting and project delivery methods. The Deloitte FAS team evaluating Auditable Unit B, Contracting and Project Delivery, will be providing more detailed findings and recommendations related to alternative project delivery methods.

2.2 Audit Area Project Delivery – Construction

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

Background:

The Construction Function is responsible for construction contract management and oversight of the delivery of capital construction projects. Within this function, the accuracy and effectiveness of construction schedule and planning controls represents a significant risk to the organization. TxDOT is at risk at being unable to manage contractor progress, verify scheduling accuracy and validate contractor estimates. The level of scheduling expertise and scheduling controls being utilized to plan and monitor construction projects varies across the Districts. Contractor developed schedules appear to be the primary source for monitoring construction progress. The management and oversight of contractor schedules and progress appears to be an informal process. Not all Districts have established a consistent process for identifying and developing baseline schedules against which progress may be measured.

Observation/Findings:

Baseline Schedules

- Prior to letting and when finalizing the plans and quantities, the Transportation Planning and Development Department (TP&D) determines a general timeframe for the construction schedule. The Design Engineer develops an initial "high-level" schedule and estimates an allowable number of working days. The District transmits this schedule to Division for approval. Once approved, Division sets a letting date and start date for the work.
- After Division lets a project, the Districts are responsible for overseeing the construction process. The Area Offices within the Districts are typically responsible for administrating and overseeing construction projects, including the project schedule and cost management.
- TxDOT's policy in the Construction Contract Administration Manual (Chapter 10, Section 2) is to use the contractor's project schedule to monitor progress and control the project time requirements. The TxDOT project manager has the primary responsibility for evaluating the contractor's schedule updates.
- The bar chart schedule is the default schedule type for all construction contracts. The levels of progress schedules that may be submitted include: an outline of work, bar chart, basic critical path method (CPM) schedule or a CPM schedule developed with specified software (either Primavera Project Planner or Suretrak) that may or may not be resource loaded.
    - The only specific requirement noted is to ensure that the duration of work activities of any type of schedule does not exceed 20 working days, unless specified otherwise in the contract.
- Area Offices can further define the type of schedule to be used through Special Provisions. This process is an informal selection process depending on the project size and complexity.
    - At a minimum, bar chart schedules are typically used.
    - The CPM schedule requirement is only used on very large, complex projects. The CPM scheduling abilities among contractors varies. According to District personnel, small or medium-size contractors may not have the resources or expertise to perform CPM scheduling (most contracts do not require CPM schedules).
- The Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges requires the contractor to prepare and submit a progress schedule, which is subject to

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

review and acceptance (Item 8.2, Prosecution and Progress). The schedule must include an estimated production rate per working day for each work activity.

- Contractors develop the project schedule, which is then reviewed by the District. The Area Office approves the contractor schedule and oversees progress during construction. The method of schedule review and approval appears inconsistent and is often based on the reviewer's experience rather than a formal review process.

Progress Reporting

- The Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges requires the contractor to submit an updated progress schedule monthly and to update the progress schedule by adding actual progress achieved during the previous update period, including approved changes to the sequence of work and the traffic control plan.
- Schedules are tracked and reviewed depending on job complexity and schedule updates are typically provided monthly and reviewed at the Area Office. Monthly progress updates are not tied to the payment process.
- The quality of monthly updates varies, as some contractors are more proficient at scheduling techniques (CPM or other methods) than others.
- When an updated progress schedule represents delay to the project, the Standard Specifications require the Contractor to notify the Engineer in writing whether the Contractor will revise the progress schedule to meet the number of working days specified or exceed the number of working days specified and be exposed to Liquidated Damages.
- When a project is more than 20% behind schedule, the Area Office is required to follow-up with the contractor to provide more information and an explanation for the delay. There is no published basis or guideline for determining whether or not a project is 20% behind schedule.

Liquidated Damages

- Liquidated damages (LD) are charged for the number of additional working days beyond the number of working days specified in the contract and are deducted from any money due to the Contractor.
- The current system for determining the daily rate for Liquidated Damages is based on the size (dollar value) of the project. LDs for a majority of TxDOT's projects are based on contact administration costs and are detailed in Special Provisions 000-275, Schedule of Liquidated Damages. Other factors can be, but are infrequently, used to increase the amounts to be charged for LDs, including A+B Bidding Strategy, Road User costs with incentives and Road User costs without incentives.
    - As detailed in TxDOT's PS&E Preparation Manual, A+B Bidding Strategy involves setting up the contract for bidding on normal scope items (Part A), and bidding on the planned number of working days (Part B). The designer (TxDOT) establishes a value for each day based on administration and road user costs.
- Districts perceive that the LDs are not high enough to provide adequate incentive for contractors to meet their completion dates and that increased liquidated damages may provide a stronger incentive to meet contracted completion dates. TxDOT's Standard Specifications state that LDs are not assessed as a penalty, but are administrative costs based on the state's daily cost incurred to administer the contract beyond the time established in the contract.

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

Use of Scheduling Consultants

- The Construction Division currently holds a state funded evergreen contract (or a blanket contract for indefinite deliverable services against which Districts can authorize work) for engineering services with a consulting firm to provide independent construction scheduling support services utilizing Primavera. Only select Districts are permitted to issue work authorizations against this evergreen Contract.
- The construction scheduling consultant services include, but are not limited to: reviewing the preliminary time determination (or Designer's time schedule) for the District project; reviewing, analyzing, and providing recommendations for the Contractor's preliminary and baseline schedules; reviewing and analyzing monthly schedule progress updates and schedule revisions; and reviewing and analyzing any Time Impact Analysis from the contractor.
- A limited number of Districts have the strong scheduling expertise required for analyzing complex CPM schedules provided by contractors. Thus, some Districts and Area Offices use the Division resources to review schedules (including evergreen consultants).
- In general, only the larger (Metro) Districts use the construction scheduling consultant to analyze and monitor schedules for larger projects with complex CPM schedules.
- TxDOT has initiated the procurement process for entering into two indefinite deliverable contracts to provide CPM project scheduling services. One contract will be for approximately $2,000,000 to provide services state wide and the other will be for $1,000,000 to provide services in the San Antonio District only. The services will include performing scheduling, monitoring and evaluation construction progress using CPM scheduling and training of CPM construction schedule analysis.

Miscellaneous Observations

- Area and/or District offices have the resources (for example a schedule coordinator) to review general requirements for the Baseline schedule acceptance.
    - In the larger Districts, Project Managers will review schedules from an "overview" perspective while the Area Office Construction Managers, schedule coordinators, or other project staff will review the details.
    - Smaller offices will assign detailed schedule review duties to the Project Managers, Assistant Area Engineers, Area Engineers, and/or District-level personnel.
- Districts find it difficult to find, recruit, and retain CPM scheduling talent. Many Districts are making an effort to strengthen their scheduling expertise by conducting in-house training and by adding more CPM scheduling software tools such as Primavera.

Impact:

The construction industry is becoming more sophisticated with respect to planning, scheduling and CPM techniques and TxDOT should similarly develop scheduling skills and resources or it will not be prepared to manage construction projects with contractors using sophisticated CPM schedules as a project management tool. TxDOT would possibly be at risk to contractors using sophisticated scheduling, especially on complex projects, and unable to effectively manage contractor progress, verify scheduling accuracy, validate contractor estimates, evaluate the effects of change orders or mitigate the risk of delays.

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

Operational Strengths / Leading Practices:

- TxDOT has initiated the process for entering into a $2,000,000 indefinite deliverable contract to provide CPM project scheduling services statewide (in addition to a $1,000,000 for the San Antonio District only). The services will include performing scheduling, monitoring and evaluating construction progress using CPM scheduling and training of CPM construction schedule analysis.
- A District is developing a construction contract scheduling tool that will help to determine the appropriate construction contract duration during the planning stage. The tool will account for the scope of the project and quantities to develop appropriate durations. This could help to standardize and improve quality of construction schedules. This is the APDSS discussed elsewhere in this report in Section, 1.1.1 Project Development – Planning, Consistency and effectiveness of schedule planning and controls.
- One District developed a custom database program to track project progress. This program uses the same data from Site Manager (which is manually input into the database) to analyze progress and determine if the project is 20% behind schedule.
- TxDOT led a study evaluating the Road User Costs associated with liquidated damages and, as of 2002, employed its own LD standards designed to enhance contractor performance.

Industry Practices

Based on our research and experience, we have identified the following leading practices:

- Most governmental organizations (including TxDOT) set completion dates or contract times in their bid documents, while some agencies will also solicit schedule information from the bidders to establish the completion date. Contractors then develop the project Baseline schedule to meet the contract completion date.
- For Design-Build (DB) project, many state DOTs require the submittal of a (preliminary) schedule with the contractor bid, which is then used in the evaluation and selection process. After contract award, the contractors are required to submit more detailed schedules to be used as the work progresses. Other relevant schedule-related clauses include:
    - Failure to submit the required schedules and updates could result in the suspension of payment. While this was a common contract clause for most DOT contracts, it was rarely used or enforced.
    - Submit a recovery schedule if progress falls behind a specified amount. The most common trigger is "Greater of 10 days or 2% of remaining time."
- Many DOTs require updates to be submitted on a monthly basis (as TxDOT does).
- Owners and contractors are becoming increasingly more sophisticated with respect to CPM scheduling. CPM scheduling is a powerful project management tool that is being increasingly used by the construction industry. CPM scheduling offers great insight to management regarding critical project activities and how to adjust time, project budget and resources to meet schedule deadlines. Schedule data can also be used to develop graphs, tables and reports for management to identify potential delays and inefficiencies.
- Owners are developing increasingly detailed scheduling requirements which may include:
    - The method of scheduling (CPM) to be used and the associated level(s) of activity and

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

logic detail;

- Specific constraints and schedule templates to be used:
- The type of computerized schedule application the Contractor should use (e.g. Primavera or Microsoft);
- The approval requirements of the baseline CPM schedule;
- The Owner's duties for review and approval;
- The need for the Contractor to designate a qualified scheduling representative;
- The procedures to be followed for periodic updates;
- The requirement for a monthly progress assessment including a written commentary;
- The definition of "float" (as an asset of the Project and not for the exclusive use or benefit of the Owner or Contractor);
- The requirements for a revised baseline schedule; and
- The use of Time Impact Analysis to demonstrate delay.

Conclusion / Recommendation for Improvements:

In general, the level of scheduling expertise and scheduling controls being utilized to plan and monitor construction projects varies across the Districts and is an area that can be strengthened. While TxDOT is developing CPM scheduling resources, the management and oversight of contractor schedules and progress is somewhat inconsistent among the Districts and appears to be an informal process.

- Districts should continue to develop in-house CPM scheduling resources and skills to improve the schedule planning, management, review, monitoring, control capabilities and general knowledge of the staff at multiple levels. This includes continuing to develop skills with Primavera Project Planner and Suretrak programs at each District through in-house or third-party training programs.
  - The indefinite deliverable contract to provide CPM project scheduling services statewide will facilitate this effort.
  - Working with outside scheduling consultants may help to educate in-house staff with regard to CPM scheduling tools and strategies.
- Division should establish a consistent statewide level of knowledge and minimum training requirements for CPM scheduling to all staff involved in schedule review and analysis and project management. While it is difficult to educate every person uniformly, there should be minimum training requirements related to proper schedule planning and control procedures. The goal of the training is to increase staff awareness of the problems which result from poorly defined schedules and educate them with respect to the CPM project management tools and strategies.
- Once the indefinite deliverable contract for CPM project scheduling services is established statewide, provide training to familiarize the Districts and Area Offices with the selected firm. This will facilitate the Districts' and Area Offices' ability to supplement their in-house resources and provide flexibility to management
- Division should establish a consistent, detailed and structured process for identifying and

2.2 Audit Area: Project Delivery - Construction	**2.2.1 Risk:** Accuracy and effectiveness of construction schedule planning and controls

developing baseline schedules against which progress may be measured and ensure that the approach is consistently implemented. While this is addressed in Chapter 4 in the Construction Contract Administration Manual, the guidelines are very high-level and generally require review for conformance with the contract.

- All Districts should establish a consistent progress reporting mechanism and ensure that a detailed and structured approach to reviewing schedule updates is consistently implemented. The goal is to generate consistent, objective reports to monitor schedule performance that can be shared at multiple levels within the organization.
- Reevaluate the Prosecution and Progress section in the Standard Specifications and consider developing more defined and sophisticated scheduling requirements. Establish robust scheduling specifications to be used as a framework for all projects.
    - For example, rather than using bar charts as the default, and adding CPM as a Special Provision, TxDOT should use CPM scheduling as the default, and allow bar charts or other methods in the Special Provisions.
    - Add clauses to the specifications to empower the Area Offices to enforce the requirement to submit and use approved baseline schedules and updates when required in the contract.
    - Explore the possibility of clarifying the definition for when a project is 20% behind schedule and add a requirement for producing a recovery schedule when the project delay reaches a defined trigger point (i.e., when progress falls behind "Greater of 10 days or 2% of remaining time."

2.2 Audit Area: Project Delivery – Construction	**2.2.2 Risk:** Effectiveness of change order process

Background:

The Construction Function is responsible for construction contract management and oversight of construction projects. Within this function, the effectiveness of the change order process represents a significant risk to the organization. In some instances, the change order process may be inefficient and there may be opportunities for improvement. The current process may result in delays or the project participants may be inclined to proceed "at risk" prior to receiving change order approval. Inaccurate coding during the changes order process presents a risk to TxDOT's ability to understand the cause of and mitigate future changes. Also, the approval amount limitations for change orders were indicated as an issue that could lead to unnecessary delays.

Observation/Findings:

Change Order Process

- The TxDOT Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges defines a change order as a written order to the Contractor detailing changes to the specified work, item quantities or any other modification to the Contract.
- The Engineer reserves the right to make changes in the work including addition, reduction or elimination of quantities and alterations needed to complete the Contract. Change Orders are paid based on several scenarios:
    - If the changes in quantities are not significant, the change work is paid for at the Contract unit price (Significant variation is defined as 25% above or below the original Contract quantity).
    - If the changes in quantities or the alterations significantly change the character of the work, the Contract will be amended by a change order.
    - If no unit prices exist, the work is considered extra and the Contract will be amended by a change order.
    - The Contractor and Engineer are to agree on the scope and basis of payment for the change order before beginning work. If there is no agreement, the Engineer may order the work to proceed under Article 9.5, "Force Account." This procedure requires the most TxDOT effort and resources as inspectors must count and record all labor, equipment and material used during installation of the changed work.
    - If the change requires additional working days to complete the Contract, the working days will be adjusted in accordance with Item 8, "Prosecution and Progress." Item 8 only addresses the working day calculations and does not address the use of TIAs or any scheduling techniques.
- The Construction Contract Administration Manual (Chapter 7) outlines the formal change order process that is initiated when a contractor submits a change order to the Area Engineer. This process generally includes the following:
    - The contractor and Project Manager initiate the process for pricing and negotiating the change order and review the cost breakdown and price justifications for any added items. The District is able to obtain assistance regarding change order reviews from the Construction Division (CST), Field Engineering Branch (FE), Design Division (DES), or the District Construction Office, as needed.
    - The Area Office Project Manager verifies the costs with the contract unit prices as well as

2.2 Audit Area: Project Delivery – Construction	**2.2.2 Risk:** Effectiveness of change order process

the state-maintained database of statewide and District average unit prices. The Project Manager also performs an independent cost analysis, and leverages his past experience to determine if the proposed unit prices are fair and reasonable.

  - Chapter 7 outlines a very detailed 15-step procedure to be followed when preparing change orders, including: the reason for the change (Reason Code on Form 2146), how to handle signatures, information and quantities needed on the change order form, instructions for completing checklists, and instructions for maintaining the originals in the contract file.

- Some Districts indicated that the most difficult issue with the change order process is accurately estimating the cost.

Approval Process Limitations

- Change Orders are only approved after a TxDOT employee with the correct signature authority approves the document. The Construction Contract Administration Manual (Chapter 7, Section 2) outlines the approval authority as follows:
  - Change orders valued at less than $50,000 can be signed by the Area Engineer. The Area Offices indicated that there is generally less bureaucracy at this level.
  - Change orders valued at less than $300,000 can be signed by the District Engineer, Deputy District Engineer, District Director of Operations, District Director of Construction, Construction Division Director and the Construction Section Director. At this level of approval authorization, the Area Offices indicated that they "know what to expect" from the process.
  - Change orders valued at more than $300,000 are to be signed at Division by the Assistant Executive Director (AED) or by Engineering Operations (EO). Area Offices indicated that obtaining authorization for change orders requiring approval from the Division is a time-consuming and cumbersome process. The perception is that they are continually dealing with new people at Division, each having different "personal" requirements for processing change orders and obtaining quotations from Division on pricing issues.
- Most Districts (we interviewed) believe the established signature authority limits are not enough for very large projects. Approval for a routine change order on a large project (i.e., adding quantities using the existing contract unit prices) can take two to three weeks and could cause delays or disruption to construction.
  - One larger District indicated that the number of change orders that required District approval is small (for example, one per month).

Reason Codes for Processing Changes

- Area Offices assign a reason code for each change order during the administrative process for preparing a change order. After prepared, all COs (Form 2146, Change Order and Site Manager COs) are sent to Division for further processing and distribution to the finance division.
- The reason codes are entered into Site Manager to provide the ability to track and report the reasons for changes on a statewide basis.
- Site Manager has recently been updated to include approximately 37 codes. Up to three reason codes can be used for each change order. Some of the more commonly used codes, descriptions and intended uses for the reason codes include:
  - Incorrect PS&E (either TxDOT or Consultant design): This code should be used when an

2.2 Audit Area: Project Delivery – Construction	**2.2.2 Risk:** Effectiveness of change order process

error and/or omission is discovered, but there is no additional cost to TxDOT, nor any contractor delay, rework or inefficiencies to the project.

  - Design error or omission that resulted in delay, rework, or inefficiencies (TxDOT or Consultant design): This code should be used when an error and/or omission is discovered and additional cost, contractor delay, rework or inefficiencies occur.
  - Differing site conditions, including unforeseeable, Acts of God, and unknown utilities.
  - Additional work desired by TxDOT or third parties.
  - Time extension.
  - Failure of a third party to meet commitment.
  - Right-of-Way or utilities not clear (TxDOT or third-party responsibility).

- Accurate and proper categorization of change orders in Site Manager is inconsistent between Area Offices.
- Smaller Districts indicated that errors and omissions are the source of 90% of the Change Orders and attribute this to inexperienced consultant designers and accelerated design schedules. Districts are being encouraged to seek reimbursement for additional project costs from consultants if the costs result from errors and omissions; however, these efforts appear to be inconsistent across the state.
- The Area Offices will identify changes on the drawings for the Engineer of Record to address. If the consultant is not available, the Area Office will make the changes. Area Offices will also make the design change when time is a consideration.

Change Order Process Risks

- Change Orders are being used to add things to the contract that should have been included in the initial design.
- Some Districts indicated that occasionally, change orders are developed to fit within the parameters of the signature authority limitations. Specifically, large change orders might be managed by either the contractor, Area Offices or both, so that the dollar value of the change is slightly less than the signature authority. This includes "Net Change Orders", in which the cost of an added work scope item is off-set by a reduction of a separate, unrelated item.

Impact:

Change orders are a part of the construction industry. Without implementing a more flexible change order process, or understanding the current process and properly assigning reason codes, TxDOT will be unable to identify issues that cause changes, mitigate the effect of changes and minimize construction delays. A protracted change order approval process can also result in construction delays.

2.2 Audit Area: Project Delivery – Construction	**2.2.2 Risk:** Effectiveness of change order process

Operational Strengths / Leading Practices:

- TxDOT recognizes the need to more closely track the causes for changes and has released an updated and expanded reason code list for more accurate and comprehensive reporting of changes in Site Manager.
- One Area Office developed a change order tracking report to monitor changes on all Area projects and meets monthly to review the status of all changes and develop action items to resolve open changes.
- Some Area Offices route the change order documents to the design office to educate the designers and to help avoid future mistakes.
- Some Districts make additional effort to clearly communicate the change order requirements to the Contractors and establish the "rules" at the pre-construction meetings.
- Some larger Districts will get involved on the larger, more controversial, change orders before the negotiation process begins and act as a "buffer" between the Area Office and the Contractor so that the Area Office and Contractor can maintain their relationship.

Industry Practices

- Several state DOTs establish varying levels of approval for change orders depending on the size of the change issue or whether or not the change is considered major when compared to the overall contract.
- Changes are considered "major" based on varying requirements, including:
    - A change to the specification;
    - Revision to a contract unit price;
    - Change in contract item amount more that 25%; and or
    - Differing site conditions practices.

Conclusion / Recommendation for Improvements:

The change order process is relatively efficient and has certain checks and balances to ensure that Districts follow the procedure and control the process of pricing, negotiating, approving and processing change orders. While TxDOT has a clearly defined process for administering change orders, the process has some inefficiencies and opportunities for improvement.

- Ensure that all Area Offices provide coaching and communicate the change order process and requirements to the Contractors at the pre-construction meeting. If practical, this process should be emphasized prior to letting.
    - Area Offices must strictly enforce and adhere to the change order process requirements.
- Consider revising the change order signature authority limit required to process change orders at the District. At a minimum, consider revising the parameters defining the authorization levels and requirements to more closely align the authority limit to the size of the project, volume of work, or percentage of work. This could be accomplished by revising the authority on a project-specific basis in the special provisions.
- Develop a committee/working group to evaluate the change order policy and leading practices and to monitor the performance metrics available from Site Manager's Change Order reporting

2.2 Audit Area: Project Delivery – Construction	**2.2.2 Risk:** Effectiveness of change order process

capabilities, including the pricing of and the types of changes.

  - This is an opportunity to analyze the reason codes to determine the major causes of changes and whether some change orders were avoidable (through better design and consultant management) and focus appropriate measures to mitigate future changes on the major causes of change.

- Ensure that Area Office staff performs adequate reviews of all design plans prior to issuing the 100% set of drawings for letting.
- Develop a post-project lessons learned process and use the change order reason codes to identify the causes of change, identify common causes of change and share experience gained during project execution.

2.2 Audit Area: Project Delivery – Construction	**2.2.3 Risk:** Effectiveness of construction related IR systems

Background:

The Construction Function is responsible for construction contract management and oversight of construction projects. Within this function, the effectiveness of the construction related IR systems TxDOT uses represents a risk to the organization. Site Manager Construction Management Software (Site Manager) is the primary system used by construction and is functioning relatively well in the field and is a highly regarded application within the roadway construction industry. Design and Construction Information System (DCIS), another system utilized for planning and managing projects, is a legacy system used by Division and the Districts for project management. Many Districts manually compile internal reports on spreadsheets that require the extraction of information from a variety of unrelated IR systems. Some of the IR systems are outdated, not effective project management tools and not effectively utilized. As a result, TxDOT is at risk of relying on inaccurate information to make decisions and being unable to adequately monitor projects. Without improving technology, there is a potential risk of inefficient use of existing staff, delays caused by paperwork and inability to mitigate costs and delays.

Observation/Findings:

- Per the Construction Contract Administration Manual, electronic collection and retention of records must be acceptable from an engineering, audit, and legal standpoint. The records system should allow a reconstruction of events that occurs on a contract. TxDOT also provides guidelines for gathering of project information, including the need to record information at the time of the events, during the course of business and from a person with direct knowledge of the events. Only authorized personnel should enter the information and measures should be taken to prevent unauthorized access, alterations or deletion of information.
- To facilitate this policy, TxDOT provides computers, software and automation equipment to be used in the collection, storage and retrieval of project and contract documentation.
- Construction personnel are directed to consult with the automation administrator for assistance in accessing Site Manager and for local network or other IR system problems.

Programs and Systems

- TxDOT uses Site Manager to track all aspects of construction projects. The American Association of State Highway and Transportation Officials (AASHTO) developed the Site Manager program to automate the construction contract administration functions for construction and maintenance projects from the time a contract is let through close out. Site Manager appears to be working well and most District and Area Office personnel consider the program a significant improvement over previous legacy systems.
- Design and Construction Information System (DCIS) is a legacy system used during preliminary engineering on construction projects and is used to produce project estimates and plan letting schedules. This system also contains contract information on completed jobs and thus serves as an historical database for work performed throughout each District.
- Financial Information Management System (FIMS) is a legacy system that records accounting events and is the system used state-wide for financial information. From a District perspective, FIMS is used for processing payments at Division. The system compiles overall project costs and produces ledger reports.

Implementation and usage of Systems

- Inspectors from the Area Offices enter Daily Work Report (DWR) information into Site Manager

2.2 Audit Area: Project Delivery – Construction	**2.2.3 Risk:** Effectiveness of construction related IR systems

on a daily basis. This includes quantities installed, labor, material, and equipment used. Typically, the construction project manager checks the entries made and these inputs become the official project Diary entries. Site Manager compiles the data which is utilized for contractor payment at the end of the month.

  - Some Area Offices still maintain a hard copy of the project diary instead of putting the information into Site Manager. Although, at the end of the month the data must be entered for Contractor pay estimates.
  - Districts and Area Offices develop customized reports from Site Manager to extract specific data and generate in-house reporting and tracking documents.
  - The Site Manager program has many additional capabilities that the Districts and/or Area Offices are not taking advantage of.
  - Some Districts find the materials tracking function difficult to use. TxDOT has begun an initiative to enhance the program to make it easier to use.
  - Some Districts would find it useful if Site Manager could be further developed to allow specific testing information to be stored. TxDOT is considering developing the program to add a Laboratory Information Management System feature.

- Many Districts have a limited number of personnel with programming expertise or who are proficient with the legacy mainframe systems. Personnel with the expertise are viewed as the experts and are utilized to gather information from the mainframe and develop custom reports in other software programs. As a result, the level of detailed reporting and types of reports that are available and used across the Districts varies.
- We found that although project cost data is available from FIMS, the Districts do not consistently use the information. While Project Managers have access to the project ledgers every month to review project costs, many do not review these reports. Some Districts even provide the Area Office Project Managers with the specific reports, but the Project Managers are reluctant to utilize the information and review the project ledgers on a timely basis.
- Some Districts are promoting and implementing a paperless environment with shared drives for project documents. The ability to use shared drives for document storage and retrieval has been very useful in exchanging information between employees.

Field Access to Hardware

- Some Area Office inspectors have been provided laptops with wireless cards that can be used on-site to input data in real-time to Site Manager. This increases productivity and the accuracy of information and allows inspectors to cover more area. Most inspectors however, do not have access to a laptop and must enter data at a computer work station or terminal located either at a project site or at the Area Office.
- Communication with and between inspectors is difficult and often inefficient. This is a result of restrictions on the use of cell phones. Lead inspectors are typically provided a radio in their trucks. Inspectors and can only be reached from another radio or a dual-band cell phone. Oftentimes, inspectors or supervisors are using personal cell phone numbers for project-related communication.

Impact:

Inefficient use of reporting features, use of IR systems and data entry methods impedes the ability to manage projects and mitigate risks and exposes construction field operations to the potential for

2.2 Audit Area: Project Delivery – Construction	**2.2.3 Risk:** Effectiveness of construction related IR systems

inaccurate data entry. Without improving the integration between various IR systems, there will be continued risk associated with redundant manual entry and inefficient use of construction related IR systems.

Operational Strengths / Leading Practices:

- Some District and Area Offices are taking steps to implement a paperless environment. One Area Office has implemented an electronic shop drawing review process, which includes electronic distribution of drawings in-house for review and approval while another District office scans documents into a data collection system to electronically organize and manage the data.
- Some Area Office inspectors are able to utilize laptops with wireless cards on-site to input data real-time. Thereby increasing productivity and the accuracy of information entered into Site Manager and allowing inspectors to cover more area.

Industry Practices

Private sector companies and state DOTs have been implementing integrated, enterprise-wide records and workflow management systems to automate management and enhance services. This includes:

- Implementing a department-wide document management system in a multi-phased approach. The system enables employees to scan a paper document, apply an index with filing information, and save the document in an associated electronic filing system. This enables documents to be universally available and reduces paper and filing cabinet needs (by 50%).
- Automating their work to incorporate plans, specifications, and daily reports into a web-based or network system to share with other involved parties and to monitor the quality of construction.
- Managing large projects by a virtually paperless office to use online collaborative programs for managing contracts, changes, drawings, submittals, RFIs, correspondence, lab data and inspection reports.

Conclusion / Recommendation for Improvements:

The construction related IR systems are a risk to the organization. Site Manager is an effective project management tool which has sped-up facets of the administration process, including automating data entry and processing pay estimates. However, the mainframe or legacy systems are outdated, not user friendly, and are not an effectively project management tool used by the Area Offices or Districts. Improvements in technology could potentially result in more effective use of existing staff, accelerate processing of paperwork, and a reduction in costs.

- Implement additional training for Site Manager at various levels throughout the organization to improve utilization and effectiveness of the system.
- Implement more formal training methods for the end users of the current mainframe applications. Communicating the system's capabilities to the end users should improve use of the systems on a consistent basis.
- Explore improving the integration of the legacy systems with Site Manager to improve use of the reporting features and produce relevant information in a stand reporting format to be used to support project management.
- Consider adding modules for Site Manager to incorporate the Laboratory Information

2.2 Audit Area: Project Delivery – Construction	**2.2.3 Risk:** Effectiveness of construction related IR systems

Management System and features to manage contract documents, drawings, and other electronic material. This will improve the capabilities of Site Manager.

- Promote, encourage, and provide the hardware and software resources to Area Offices that enables inspectors to utilize current technology and to automate the construction administration process. This will increase productivity and accuracy of information and allow inspectors to cover more area. Wireless technology will also promote more effective communication.
- Consider ways to improve communications among the field inspectors. For example, expand the use of contract terms that require the contractor to provide dual-band cell phones for use on the specific project.

2.3 Audit Area Project Delivery – Maintenance

2.3 Audit Area: Project Delivery – Maintenance	**2.3.1 Risk:** Effectiveness of maintenance information resource systems

Background:

To facilitate the self-performance of highway maintenance work and the oversight of contracted maintenance projects, the Maintenance Department utilizes numerous IR systems. There are issues with retrieving information from the various mainframe systems and the lack of a single source platform, and as a result, the systems do not effectively communicate with each other. The systems used by the Maintenance Department include the Material & Supply Management System (MSMS), the Maintenance Management Information System (MMIS), the Financial Information Management System (FIMS), Site Manager, Automated Purchasing System (APS), Equipment Operating System (EOS), the Single Entry System (SES), and a system used by salaried employees to enter time. TxDOT is at risk of incurring additional cost due to the inefficient IR processes associated with several of these legacy systems. The ease of use, reporting capabilities, reconciliation processes and data entry processes have been identified as potential areas for improvement.

Observation/Findings:

Programs and Systems

- Material & Supply Management System (MSMS) is a legacy system used for material stock management.
- Maintenance Management Information System (MMIS) is a legacy system that provides statistics on roadway maintenance and produces data on workload and operational planning efforts to analyze maintenance activities to improve productivity. Within MMIS;
    - Work location, quantities and cost of work are assigned to maintenance task codes and entered into the system. The data is primarily used for the Maintenance Effectiveness and Analysis Report (MEARS) report.
    - Reports show the costs to perform work and users can create reports to compare costs to other Districts state-wide. Districts create their own reports as there is no standard report format.
    - Inspectors require significant training on using the Mainframe programs as there continue to be mistakes in coding tasks.
    - Only a limited number of people know how to use the mainframe systems effectively and they become the Districts' key sources to do data entry and generate reports.
- Financial Information Management System (FIMS) is a legacy system that records accounting events and is the official system used for financial information. From a District perspective, FIMS is used for processing payments at Division. The system compiles overall project costs from most of the other legacy systems and can generate several useful reports. Specifically, FIMS produces ledger reports for overall project costs.
    - Although project cost data is available from FIMS, the monthly project ledger reports are not consistently reviewed or utilized by District Project Managers.
- Site Manager is used to track all facets of construction projects. The Site Manager program is an AASHTO system that automates the construction contract administration functions for construction and maintenance projects and the materials and testing from the time a contract is let through close out. Site Manager appears to be working well and most District and Area

2.3 Audit Area: Project Delivery – Maintenance	**2.3.1 Risk:** Effectiveness of maintenance information resource systems

Office personnel consider the program a significant improvement over the legacy systems and are satisfied with Site Manager

- Automated Purchasing System (APS) is a newer DOS-based legacy system that is typically used to process purchase orders less than $15,000 and takes about two weeks to process an order.
    - Maintenance shop workers have difficulty using APS as the system is cumbersome and requires an inefficient level of detail to be entered into the system to order simple items such as small equipment, tools and parts.
    - The system has some "kinks" and users are frequently kicked out of the system.
    - Some of the Districts are trying to integrate the systems and most believe that APS needs to be improved.
- Equipment Operating System (EOS) is a legacy system that tracks equipment usage. Area Office managers manually enter data into EOS daily. One issue is that the system compiles information over-night and the Area Offices cannot determine if there was a problem with the data entry until the next day. The District sends out monthly reports to the Area Offices to summarize the costs for the equipment tracked in EOS.
- Single Entry Screen System (SES) is a finance system for input of labor, equipment, materials and quantities installed at a single entry point for distribution to the mainframe systems, including MSMS, EOS and MMIS. This system also provides an automated time report.
    - Maintenance crews manually fill out Daily Activity Report (DAR) work forms (typically the crew leader) which include the job description, segment number, detail number and code. The DAR also includes the quantities installed, personnel time, equipment and material. The DAR is turned in to the Area Office at the end of the day.
    - The data and charges are checked and manually entered into SES by an office manager or clerk. SES integrates with the EOS, MMIS, payroll and other legacy systems. The Area Offices are pleased with the SES system.
    - At the end of the month, the Area Maintenance Supervisors can pull an "R12" report that analyzes equipment utilization and reconciles with the amount charged in MMIS.
    - The reconciliation effort is extremely time consuming since Area Office managers have to manually review the hand written timesheets, DAR forms, EOS forms, and other documentation to catch any errors.
- Maintenance departments also use the Construction/Maintenance Contract System (CMCS) to process and manage maintenance contracts. It is primarily used to prepare, pre-qualify, let and pay maintenance contracts.
    - The Districts let maintenance contracts less than $300,000.
    - Forms 1257 and 1258 are used to track contract information that is entered into CMCS and to process payments. The data is entered at the end of the month to create a pay estimate that is then reviewed by the Area Engineer or Assistant Area Engineer for approval to pay.

Implementation and usage of Systems

- Maintenance field personnel commented that the systems were adequate but cumbersome and difficult to use. Most information is hand-written on daily report sheets, which is then manually entered into the mainframe system.

2.3 Audit Area: Project Delivery – Maintenance	**2.3.1 Risk:** Effectiveness of maintenance information resource systems

- One District is currently developing a Maintenance Management System that would allow Maintenance Directors to see the status of costs spent in real time.
- SES and MSMS are not fully integrated and cause redundant work to enter complete data for one job. For example, a DAR might contain details for 12 individual parts required for installation of a sign. SES will only allow six or seven items to be charged to one DAR. The clerk will have to create another job in MSMS to complete tracking of all parts used for the job.
- TxDOT is currently working on a statewide initiative to improve the maintenance IR systems. Please see the "Operational Strengths / Leading Practices" for further information.

Impact:

Inefficient use of reporting features and continued manual entry into the maintenance IR systems places TxDOT at risk with respect to inaccurate data, erroneous reporting and inefficiency. Without improving the integration between various IR systems and input methods, there will be continued risk of inefficient IR processes leading to increased systems maintenance costs.

Operational Strengths / Leading Practices:

Compass Project

- TxDOT has created a team consisting of Division and District personnel to evaluate and improve the current maintenance IR systems. The initiative is called the "Compass Project" and its goals include the following:
  - Provide useful tools and data to all management levels
  - Improve user interaction
  - Reduce amount of data entered
  - Reduce time spent manually gathering information
- To accomplish these goals the Compass Project has identified several areas for improvement including the following:
  - Replacement of MMIS
  - Replace the use of SES by maintenance employees
  - Development of interfaces with legacy systems
  - Modify legacy systems to support MMS information
  - Training users
- The Compass Project should substantially improve the usability of the current IR maintenance systems and provide improved data management capabilities and reporting.

Other TxDOT Practices

- One District has developed a program tool to assist the management maintenance contracts by monitoring and balancing the routine maintenance (Strategy 144 funding) costs spent between various contracts and the duration and expiration dates of the contracts. The program extracts data from four to six different tables in the mainframe systems into a relational database from which queries can be run. These queries can identify contracts with shortfalls or overruns to

2.3 Audit Area: Project Delivery – Maintenance	**2.3.1 Risk:** Effectiveness of maintenance information resource systems

help balance spending and "flag" or notify users of contracts that need attention.

- Some Districts implement a consistent practice of pulling reports from MMIS to compare productivity data to other Districts and Area Offices.

Conclusion / Recommendation for Improvements:

In general, the maintenance related IR systems are a risk to the organization. While there is general consensus that the SES system has been a major improvement over previous legacy systems, there is an overall perception that the mainframe legacy systems are outdated and not user friendly. MMIS, for example, is a cumbersome and antiquated system that is not user friendly and not productively used by the maintenance departments. TxDOT has recognized these risks and is currently taking steps to evaluate the maintenance IR systems and make necessary improvements. TxDOT should continue to support the Compass Project and its goals. Improvements in technology could potentially result in more effective use of existing staff, acceleration in the processing of paperwork and a reduction in costs. Recommendations to consider include:

- Implement more formal training methods for all users of the current mainframe applications. Communicating the system's capabilities to the end users may improve the usage of the system on a consistent basis.
- Develop more standardized reports which can be used on a consistent basis (monthly) to compare maintenance costs.
- Implement training on APS, as turnover of personnel results in inefficient usage of this system at the local levels with the responsibility for purchasing.
- Promote, encourage and provide the hardware and software resources to Area Offices that enables inspectors to utilize current technology and to automate the contract administration process. This will increase productivity and accuracy of information and allow inspectors to cover more area. Wireless technology will also promote more effective communication.
- Consider ways to improve communications among the maintenance field staff and inspectors. For example, expand the use of contract terms that require the contractor to provide dual-band cell phones for use on specific maintenance project(s).

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

Background:

The Maintenance Function is responsible for a significant portion of the TxDOT annual budget and the effectiveness of controls on maintenance budgets represents a significant risk to Districts. Maintenance budget funds are allocated to the Area Offices, which are then responsible for managing their own budgets. It appears that the current computer system only allows a limited number of users to access the system and extract and analyze information into spreadsheets. The Areas and Districts are at risk of being unable to accurately forecast and prepare budgets, manage budgets, accurately report in-house expenditures, manage contractor progress and validate contractor estimates and costs. TxDOT is also at risk because their data entry into the maintenance IR systems is completed manually and is a time consuming process prone to human error, thus; resulting in inaccurate information and inefficient rework.

Observation/Findings:

TxDOT Budgeting and Fund Allocation Processes

- The formula for allocating funds to Districts is based on the Unified Transportation Program (UTP) formula and numerous other factors. The UTP formula is extremely complex and involves many factors, including: the amount of infrastructure, truck traffic, rest areas, etc. The maintenance allocation also considers Pavement Management Information System (PMIS) scoring, road conditions, equipment needs and the number of permits for heavy loads.
    - Larger Districts perceive that the formula for allocating funds is biased to other Districts and that funding is not keeping pace with demand.
    - The size of the vehicle fleet is established by the Texas Building and Procurement Commission, Office of Vehicle Fleet Management. Division then allocates the capital equipment budget to the Districts and sets the number of fleet vehicles allowed to each District. TxDOT can only increase the overall fleet size when there is a legislatively mandated program change, federal program initiative, or a documented need demonstrated by Area Offices for additional vehicles resulting from program growth or changes.
    - Some Districts allocate funds to Area Offices based on the UTP formula.
- Once Division allocates the budgeted funds to the Districts, the process for distributing those funds to the Areas in some Districts includes:
    - Districts request that the Area Engineers provide a list of projects to be completed as well as the costs for routine maintenance. Area Engineers and maintenance supervisors will meet and use PMIS and Texas Maintenance Assessment Program (TxMAP) data to set priorities for maintenance work. Areas will then submit a generalized planning report to Division that is not project specific.
    - The Area Engineers prioritize their project needs and estimate their project specific costs. The District committee then reviews the needs of all Area Offices and approves certain projects for construction.
    - Selected projects enter the Project Status Report for planning, development and design.
    - Area Offices will alter the job limits to fit within the budget allocation from District.
    - After letting, all project issues are handled at the Area Office. The Area Office determines the staffing level for inspectors and uses Site Manager to manage project

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

records.

- Smaller Area Offices are not always involved with developing the plan, especially when the District reviews and approves the design and lets the project without Area Office review.

- Districts develop the maintenance plan at the beginning of the year to include work performed with Area Office's internal personnel, contracted work and money for materials. The estimates for the maintenance budgets are based on Area Office engineering input and historical cost data.
  - Material price escalation has been a recent risk. Using standard inflationary rates to forecast material costs has not provided adequate funds for materials given the current economic conditions and fossil fuel prices. As a result, Districts are receiving less material for the funds allocated.
- PMIS is used state-wide to determine and rate the condition of the roads and is tied to funding allocations. The PMIS formula is tied to and is a measure of ride quality, although some maintenance directors believe that it is a measure of road inventory and not quality.
  - One drawback is that good PMIS scores can result in less money being allocated for maintenance when additional funds are actually needed. For example, a new surface coating could improve PMIS scores, yet the underlying road bed could be poor quality and the road needs total replacement.
  - TxMAP is another road rating system that provides scores for more subjective items and addresses three main roadway components: pavement conditions, traffic operation (signage, lighting) and roadside conditions (ROW, landscaping). Districts can use PMIS to improve TxMAP scores.
  - Districts indicate that the PMIS scores are about one year behind the maintenance plan.
  - Map Zapper, a system that uses PMIS scores to color code roads, is beneficial in portraying a snap shot of the most critical areas on which to focus project letting.
  - Some Area Offices place little faith in the PMIS system and are frustrated at being held to PMIS scores to improve TxMAP scores when they believe that other roads in their areas require work. Area managers are to a point where they just adhere to PMIS and as a result, there is a lack of consistency among users of the equipment and system features.

Budget Structure, Allocation and Categories

- Districts allocate money for maintenance to three funds based on the forecast budgets, which are developed with input from the Area Offices, Maintenance Sections, and District Maintenance:
  - Category 1 Funding: used for preventative maintenance, rehabilitation and construction.
  - Strategy 105 Funding: used for overhead, FTE salaries, materials and for maintenance performed in-house. In-house projects include paving, seal-coating, overlay and other repair projects.
  - Strategy 144 Funding: used for routine maintenance contracts. This money is distributed based on various factors affecting the District's maintenance needs as well as consideration of PMIS scores. Districts let most of the contracts in this strategy.
- Some Districts provide Area Offices provisions to control and shift money going into and between strategies 105 and 144. Specifically, they can request (from the District) that funds be

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

transferred from the materials budgets into the contract budgets.

  - Area Engineers would like more flexibility to transfer funds from the contract budgets in strategy 144 to the other categories.

Budget Control

- Actual costs charged against the budgets are based upon work completed and the costs are reported through the Budget Information System (BIS) in the Strategy Summary by Budget Object reports. These reports are available to the Districts and are updated to show the Budget Amount, Life to Date Spent, Remaining Balance and Current Month Spent for the budget objects with each strategy.
  - Districts indicated that it would be easier to plan and budget for work if the actual cost spent against the budget was based upon the letting amount instead of the actual funds spent. This approach is similar to the method for tracking construction funds spent based on the volume of contracts let.
- Inspectors from the Area Offices enter Daily Work Report (DWR) information into Site Manager on a daily basis for Category 1 projects. This includes quantities installed, labor, material and equipment used. Typically, the construction project manager checks the entries made and these inputs become the official project diary. Site Manager compiles the data which is utilized for contractor payment at the end of the month.
  - Some Area Offices still maintain a hard copy of the project diary instead of putting the information into Site Manager. Although, at the end of the month the data must be entered for contractor pay estimates.
  - Districts and Area Offices develop customized reports from Site Manager to extract specific data and generate in-house reporting and tracking documents.
  - The Site Manager program has many additional capabilities that the Districts and/or Area Offices are not utilizing, such as comprehensive change control and earned value performance metrics.
  - Some Area Office personnel do not use Site Manager to enter routine maintenance contract information because the system is not compatible with MMIS.
  - Some Districts find the materials tracking function difficult to use. TxDOT has begun an initiative to enhance the program and make it easier to use.
- Maintenance spending tends to increase during the summer and towards the end of the fiscal year (which is the end of August). While more work is typically performed during the summer due to favorable weather, District personnel indicated that this trend is partially due to the need to exhaust the entire budget allocation for routine maintenance contracts in a given year or risk losing future allocations.
- Districts are required to contract out approximately 50% of the work for striping and painting, mowing, sweeping, guardrail repair, level-up, among other scopes of work.
- Districts are allowed to let local maintenance projects less than $300,000.
- Division lets maintenance contracts with values more than $300,000. According to the Districts, delays have been experienced to the notice to proceed, sometimes for up to six weeks, because Division does not have enough contract personnel performing reviews.
- State statues and rules require that TxDOT use vendors listed on the Centralized Master Bidders List (CMBL) to obtain quotes and bids. Vendors must be registered on the CMBL to be able to furnish materials, equipment, supplies and services to the State of Texas. Districts expressed

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

frustration with this policy because it can result in some inefficiency, especially with equipment and vehicle repair:

  - Procuring parts for equipment repair has resulted in down-time while waiting for parts to become available.
  - The procedure at some Districts is to send vehicles to the District shop for repair. This creates down time at the Area Office, especially when the repair could have been completed at location closer to the Area's maintenance yard.
  - Area Offices want more flexibility for sending vehicles out for repair.

- Division controls spending at the District by requiring Division approval for any request more than $25,000 and by ensuring that spending is in accordance with legislative mandates. Typically, projects are submitted to the Division where they are prioritized based on available funding. As a result, there is some inefficiency for Districts. For example, Districts have a need to construct buildings and truck sheds for maintenance equipment but Division will not approve the costs. As a workaround, Districts will first purchase the material, then, will erect the shed with separate funds.
- If there is a need to perform special work quickly, Districts can issue a Special Purchase Order limited to $15,000.
- Change orders on maintenance contracts are typically a result of a change in site conditions.
  - Change orders valued at less than $100,000 require approval from the Director of Maintenance at District. The Area Offices indicated that there is generally less bureaucracy at this level.
  - Change orders with a value up to $250,000 require approval from the Deputy or Maintenance Division Director.
  - Change orders valued at more than $250,000 require approval from the Assistant Executive Director for Engineering Operations. District and Area Offices indicated that obtaining authorization for change orders requiring Division approval is a time-consuming and cumbersome process. The perception is that they are continually dealing with new people at Division, each having different "personal" requirements for processing change orders and quotations from Districts on pricing issues.
- Blanket purchase orders are used to order bulk material, such as aggregate, sand, hot patch, etc. Material is delivered to specific yards at the Area Offices which then can allocate material to projects as needed.
  - Material costs are rapidly and unpredictably increasing and have decreased the amount of material available for projects given the same level of funding.
- While Area Office technicians enter maintenance cost data into EOS (through SES) daily, the Area Offices cannot determine if there was a problem or errors in the data until the next day; after a "back-end" report is run.

Impact:

Without enhancing budget metrics and controls on maintenance budgets, TxDOT will not be prepared to effectively and accurately forecast and prepare budgets, perform financial planning, manage the budgets, accurately report in-house costs and analyze the performance of work performed by TxDOT employees and contractors. Since the Maintenance Function is responsible for a significant portion of the TxDOT annual budget, the effectiveness of controls on maintenance

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

budgets represents a significant risk to the organization.

Operational Strengths / Leading Practices:

- TxDOT's Compass Project is developing the maintenance budget reporting and planning capabilities of the maintenance IR systems. The enhanced IR systems will help ensure accurate overhead reporting. The Compass Project will help define the structure for reporting maintenance activities and develop improved performance guidelines. Budget resource management will also be enhanced to better capture costs associated with labor, equipment, materials and contracts.
- Districts utilize reports from MMIS to compare productivity data and unit costs to the productivity and unit costs achieved by other Districts and Area Offices. This includes in-house and contractor costs compared to other Districts, Area Offices and state-wide This identifies the high and low performers, focuses on potential best practices and is used to determine if TxDOT:
    - is achieving competitive costs to perform the work;
    - should review its means and methods of performing specific work; or
    - should outsource specific work items to the private sector.
- One District has developed a program tool to assist the management of Routine Maintenance contracts by monitoring and balancing the Strategy 144 costs spent between various contracts and the duration and expiration dates of the contracts. The program extracts data from four to six different tables in the mainframe systems into a relational database from which queries can be run. These queries can identify contracts with shortfalls or overruns to help balance spending. The program will "flag" items to notify users of contracts that need attention.
- In the Districts interviewed, initial prioritization for funding is the responsibility of the Area Engineers to assure the most effective allocation of funds.

Industry Practices

- Based on research and experience, state DOTs are using a variety of arrangements to capitalize on private contracting for maintenance work to cap costs and to shift risk to an outside source.
    - Numerous state DOTs are outsourcing winter maintenance services and are including performance measurements as a basis for payment;
    - Several state DOTs are developing agreements with local counties and municipalities for maintenance;
    - One DOT maintains a list of pre-qualified contractors to assist with maintenance when in-house personnel are fully utilized.

Conclusion / Recommendation for Improvements:

The effectiveness of maintenance budgeting and controls can be improved to mitigate potential risks. TxDOT utilizes MMIS to analyze unit costs for maintenance work, however, there can be additional tools developed and implemented to enhance the maintenance budget controls. TxDOT has recognized this opportunity and is planning to replace the MMIS system as part of the Compass Project initiative. TxDOT should continue to develop the Compass Project to improve the efficiency and reporting capabilities of the maintenance IR systems. In addition, the following actions can help to ensure more effective control of maintenance budgets:

2.3 Audit Area: Project Delivery - Maintenance	**2.3.2 Risk:** Effectiveness of controls on maintenance budgets

- There is an opportunity to electronically automate the maintenance systems data entry process which would eliminate the potential for human error and improve accuracy. This could result in greater efficiency and allow for the allocation of FTEs to other functions. TxDOT should provide the hardware and software resources to Area Offices that enables inspectors to utilize current technology to automate facets of the maintenance administration process.
- Research financial hedging strategies and strategies used by other DOTs for purchasing materials to mitigate the cost escalation of material.
- Provide additional PMIS training to maintenance employees at the Area Offices to familiarize the personnel and communicate the goals of using PMIS. This will improve the consistent and proper use of the data.
- Provide in-house training on the legacy systems and SES. This will emphasize the importance of accurate data entry and charging costs to the correct maintenance codes or sections. Conduct this cross-training with Division personnel to provide field experiences to Division while giving District and Area Office personnel insight into the end use and importance of the daily data entry.
- Organize a work-group with Division personnel to improve communication between parties and implement improvements to streamline the contract review process. The goal is to promote cooperation between Division and District personnel, identify communication issues and "pinch points" between specific Divisions and the Districts and facilitate the review process.

2.3 Audit Area: Project Delivery - Maintenance	**2.3.3 Risk:** Utilization of total maintenance contracts

Background:

Districts have the ability to let total maintenance contracts on sections of the TxDOT highway system, but most use these contracts for non-roadway work. Based on the District's experiences with the current total maintenance contract structure, if TxDOT uses total maintenance contracts for roadway repair work, there is risk of receiving a deficient quality of work, increased costs to complete the work and a loss of control over decision making.

Observation/Findings:

TxDOT Policy and Processes

- For all Districts, maintenance is a major area of focus. The existing infrastructure is reaching critical limits of capacity and needs additional funding to perform maintenance repairs.
- Maintenance tasks include work to maintain the roadways within the Right-of-Way, including: pothole repair, crack repair, spalling pavement repair, mowing, litter, cleaning and sweeping, graffiti removal, rest area maintenance, landscaping, tree and brush removal, drainage, fencing and lighting maintenance.
- TxDOT maintenance departments also perform the following types of work:
    - Support the county road system by supplying salvage material for maintenance.
    - Assist airports within each District through the Routine Airport Maintenance Program (RAMP).
    - Maintain the pavement of state parks.
    - Perform janitorial services, landscaping and building maintenance.
    - Ferry maintenance and operation

Use of Contracts

- Total Maintenance Contracts are used for state rest areas.
- Funding for total maintenance projects comes from Strategy 144 funds.
- Most Districts interviewed were not utilizing total maintenance contracts.

TxDOT Experience and perception

- Districts with a history of using total maintenance project noted that these contracts were not successful because of a lack of structure to the contract and management. Contractors were charging and being paid for work that was not performed.
- Several Districts indicated that total maintenance contracts typically started out effectively, but then the contractor begins to neglect the work and eventually "gives up". The Districts perceive this as a contract issue, where the inspectors and Area Offices do not have adequate contract terms or are unable to enforce the existing provisions to hold the contractor accountable for performing the work.

Operational Strengths / Leading Practices:

TxDOT practices

- One District structured a total maintenance contract in a line item format wherein the

2.3 Audit Area: Project Delivery - Maintenance	**2.3.3 Risk:** Utilization of total maintenance contracts

contractor provided unit prices for items of work and TxDOT directs the contractor to perform specific items of work. This removes the contractor risk as TxDOT directs the contractor to perform specific work "on-demand."

Industry Practices

- Several states let contracts for total facility maintenance (including routine, incident-related, preventive and restorative). These efforts have generated significant controversy as the decisions appear based on short-term cost savings and exclude consideration of the benefits of longer-term performance as well as the risks of inflation, third-party damages and insurance.
- A state DOT with experience using total maintenance contracts is creating a second generation of contracts to incorporate the benefits of experience, including reallocation of risks associated with weather, opportunities for mid-term adjustment, refined outcome measures and incentives for innovation.
- Research revealed that two of the of the best practices of DOTs with total maintenance contracts is to structure contracts with pay items based on:
    - Output - pay items tied to actual work accomplished, i.e., units of work performed,
    - Outcome - pay items which typically specify that the contractor is to achieve a specified level of performance within a period of time, i.e., within 24 hours of a snow event, bare pavement will be exposed.

Conclusion / Recommendation for Improvements:

In general, the use of total maintenance contracts is an opportunity to the organization; but is not without risk. A majority of Districts do not use total maintenance contracts and found them to produce poor quality work at increased costs and removed any decision making control over the contractor. However, total maintenance contracts could be very effective with some re-structuring of the contract terms.

- Given the limitations of doing maintenance within existing budgets, the use of total maintenance contracts could free up FTE allocation for other projects as well as allow Districts to re-allocate any potential cost-savings for other maintenance work.
- Review and modify contract terms and the structure of total maintenance contracts with regard to performance to allocate accountability to the contractor and minimize risk to TxDOT.
    - Write performance criteria into the contract and specifications to assure quality.
    - Include penalties or deductions for violations of contract work performance.
- Develop a program to use a total maintenance contract based on the line-item or "on-demand" contract structure. This could be attempted at a larger (metro) District that has a large contractor resource pool. To manage this work, the District could locate a maintenance engineer and group of FTE's in each Area Office to:
    - Develop and manage the total maintenance contracts;
    - Conduct daily inspections to request any needed repairs; and
    - Inspect and verify that the work was completed.

  This would enable the Districts to re-allocate FTEs, which were previously committed to performing in-house maintenance, to other areas where workload exceeds the available resources (i.e. Construction Inspection).

2.4 Audit Area Project Delivery – Inspection

2.4 Audit Area: Project Delivery – Inspection	**2.4.1 Risk:** Consistency, prioritization, effectiveness of inspection scheduling, planning, and controls

Background:

Districts are experiencing increased difficulty allocating qualified inspectors to the appropriate projects largely due to the significant increase in the amount of construction and maintenance projects being executed in recent years. In addition, TxDOT considers the construction Inspection Function to be representative of its commitment to quality to the Texas traveling public and therefore generally uses inspectors that are Full Time Equivalents (FTEs) of the organizations to perform the primary evaluations of its projects. TxDOT has begun utilizing commercial testing labs to help ease the work load of inspectors. Areas within Districts are encouraged to share inspectors to help meet varying demand. Districts are experiencing issues with inspection consistency, prioritization, effectiveness, scheduling, planning and controls creating a quality risk to the organization.

Observation/Findings:

- There is a shortage of inspectors in some Districts largely due to increased difficulty allocating qualified inspectors combined with an increase in construction and maintenance projects being executed. We found that, although inspectors are being shared between Area Offices within a District, there may be a reluctance to share resources between from Districts.
- TxDOT's current practice is to perform the primary construction and maintenance inspection services solely with internal TxDOT personnel. However, some Districts are contracting out various aspects related to inspection, such as material testing, to third party consultants. Additionally, some Districts have also allocated internal design or maintenance resources to supplement the inspection staff and help manage the increased inspection workload.
- Planning and scheduling to assign inspectors for projects is performed independently at the District level. Some of the larger Districts have developed spreadsheets in-house for tracking and scheduling inspections in order to facilitate the allocation of personnel based on their availability and skill set.
- Smaller Districts often do not use an inspecting scheduling and tracking tool, largely due to the inherent size of their projects and the number of locally available inspectors.
- Some Districts track and assign inspection workload based on the total project value managed by each inspector
- Ideally, District and Area Offices would like to assign one inspector per project, however; the inspectors are typically responsible for multiple projects.
- The Construction Division has just implemented the Inspection Training Program (ITP), which included a formal inspector mentoring program.

Impact:

The successful delivery of the Inspection Function is a critical component of TxDOT's overall success. A lack of focus to improve the consistency, prioritization, effectiveness of inspection scheduling, planning and controls could negatively affect TxDOT projects and potentially increase the risks related to the quality of delivered services and any resulting rework, delays and additional costs.

2.4 Audit Area: Project Delivery – Inspection	**2.4.1 Risk:** Consistency, prioritization, effectiveness of inspection scheduling, planning, and controls

Operational Strengths / Leading Practices:

- The exclusive utilization of TxDOT inspectors demonstrates their commitment to delivering the highest quality service to the patrons of Texas roadways. Strengthening quality control and quality assurance is a shared belief across TxDOT.
- TxDOT has begun outsourcing some of its inspection activities such as lab testing to alleviate the growing workload of its inspectors and the need to hire additional inspectors.
- Many private sector owners and state DOTs use Construction Engineering Inspection (CEI) firms for project inspection as a means of augmenting their staff. The CEI services may include performing daily inspection activities, materials testing, and project administration services.

Conclusion / Recommendation for Improvements:

With the exception of material testing, TxDOT provides inspection services with internal personnel. As TxDOT's level of construction and maintenance projects grow, the current number of inspectors is not going to be capable of providing the necessary level of inspection support. TxDOT should reconsider its current practice of using only TxDOT personnel for inspection services and the possibility of using outside inspection consultants to support growing needs as they are currently doing in other services such a material testing.

- There is a need for more inspectors within TxDOT and each District should be concerned with recruiting, hiring and training of new inspectors to continue the high level of quality control and assurance currently being delivered. A planning tool should be developed to enable TxDOT to monitor and respond to work load requirements and to re-organize or re-distribute inspectors where needed.
- Many Districts are becoming involved in extremely large and more technically challenging projects. Based on the number and complexity of existing and upcoming projects, it is important to have a planning and scheduling tool that can assist in effectively prioritizing roles and responsibilities for inspectors. Although resource leveling for inspectors may not be feasible in the smaller Districts, this proactive approach will ensure that larger Districts are prepared for any shortfall of inspectors and are prepared to re-organize and re-distribute FTEs based on workload requirements.
- Industry practices in the private sector and other state DOTs demonstrate the feasibility of using CEI firms for project inspection. As an organization, TxDOT should perform a skills inventory assessment regarding its capacity to execute inspection for the current capital program. This assessment should compare the size of the program to the internal and external skill sets and resources that are currently under the control of the organization.
- Consider conducting a cost-benefit analysis to determine the advantages of enlisting outside CEI firms. The purpose of having CEI firms available to augment inspection resources is to avoid potential problems meeting the increasing demand for inspection services as the future demand will most likely exceed internal capacity. Additionally, as third party inspection firms are retained, TxDOT would need to create standards of risk, quality and practices to ensure the consultants deliver services consistent with the organization's current business practices.

2.4 Audit Area: Project Delivery – Inspection	**2.4.2 Risk:** Adequacy and District level understanding of inspection process on CDA projects

Background:

On current CDA projects, particularly concession projects, inspections are performed by an independent engineer who is reimbursed by both TxDOT and the concessionaire. There appears to be confusion as to whether or not TxDOT inspectors are responsible for performing inspections on CDA projects. One argument for requiring TxDOT inspectors on CDAs is that the traveling public is not concerned with who constructs or operates the roadway, but only knows that it is a TxDOT roadway and therefore has expectations that the road is inspected and approved by TxDOT. The argument against having TxDOT inspectors performing inspections is that TxDOT will not operate the roadway until it is turned back over, and the responsibility for the construction of the roadway that will meet all the requirements under the CDA, including the quality and inspection of the construction should be totally the responsibility of the CDA contractor. Given these arguments and the uncertainty regarding TxDOT inspector responsibilities, TxDOT is exposed to risk as inspectors could exceed the limits of their roles as detailed in the CDA process, perform management or other functions which place unforeseen responsibility on TxDOT or diminish quality of the completed roadway.

Observation/Findings:

The overall roles and responsibilities of TxDOT and the Developer are detailed in Section 2.1.1, "Effectiveness of CDA management and oversight." For clarity, some of the observations and findings that are relevant to inspection are repeated in this section. These include:

- The Developer has responsibility for the overall design and construction being performed in the CDA process and will perform Quality Control, with monitoring and oversight of Quality Assurance is performed by an Independent Engineer (IE). In its proposal, the Developer identifies an IE from the TxDOT approved list and TxDOT and the Developer each pay for half of the IE's compensation.
- The IE's roles are limited to monitoring, auditing and oversight of the Developer's performance during design and construction.
- With respect to inspection during the construction process, the basic responsibility for each District is to provide oversight and contract administration of the IE.
- Area Offices provide inspectors to CDA projects within their District.
- TxDOT has the contractual ability to check the design and construction work, limited to checking that the QA/QC process is being followed and verifying contract compliance.
- Relatively few Districts have had appreciable experience with the CDA project delivery process. Within those Districts, a few of the "star" performing engineers or inspectors are selected to participate in the process.

Impact:

Since relatively few Districts have had any appreciable experience with the CDA process, there is a risk that TxDOT inspectors involved on CDA projects will not have sufficient experience to fully understand the limits of their oversight role or effectively manage and oversee the CDA inspection process. This could expose TxDOT to risk (should inspectors over-step the limits and become involved in day-to-day operations) and jeopardize the quality of the completed roadway.

2.4 Audit Area: Project Delivery – Inspection	**2.4.2 Risk:** Adequacy and District level understanding of inspection process on CDA projects

Operational Strengths / Leading Practices:

- TxDOT is in the process of developing a programmatic system and standard technical requirements for the overall CDA program.
- During the past year, TxDOT has conducted several training sessions related to the CDA process, including short courses, video conferences and full-day seminars.
- TxDOT provides the opportunity for inspectors from anywhere within a District to participate in the CDA inspection process. This provides an opportunity for inspectors with the appropriate skill sets to manage IE firms and gain exposure to projects which may not be typical of their District.
- The TxDOT DB project team has developed and is effectively using an Inspection Management System (I2MS) to gather, manage, analyze and validate all inspection and other project data. I2MS is a web-based system that performs statistical analysis of testing as required by the Code of Federal Regulations. See Section 2.1.1 Risk: "Effectiveness of CDA management and oversight" for additional features and benefits of I2MS.
- Leading practices followed by other state DOTs show that projects typically utilize independent Construction Engineering Inspection (CEI) firms for project inspection.

Conclusion / Recommendation for Improvements:

The project delivery methods in the CDA process are not the typical design-bid-build process to which TxDOT inspectors are accustomed. TxDOT needs to ensure that the District-level CDA project management and inspection oversight personnel are prepared for the flexibility and speed of construction afforded by the CDA process. TxDOT is taking steps toward developing more structure around the CDA process and providing their inspectors with exposure to CDA projects. The following actions may help to achieve this goal:

- TxDOT should continue to develop inspectors that want to participate in the CDA oversight process. Clear roles and responsibilities for TxDOT inspectors should be put in place to make certain that the quality of construction on CDA projects adheres to TxDOT's quality standards.
- Districts should rotate inspection assignments to expose more inspectors to the CDA process.
- Training for TxDOT personnel should emphasize that their scope of authority will be limited and will not involve directing or approving design and construction work.

2.4 Audit Area: Project Delivery - Inspection	**2.4.3 Risk:** Adequacy of technology resources

Background:

Technology resources are an important tool used for tracking and reporting inspection data. The ability for inspectors to spend more time in the field is imperative to the quality of the projects. Real time communication between inspectors and project managers is also a key component to the success of projects. Concerns have been expressed regarding the limited hardware resources (computers and cellular phones) in the field for entering inspection data and communicating information. This results in inspectors returning to Area Offices for data entry, as opposed to completing this in the field, and a lack of communications and flow of information to project managers and personnel. The absence of adequate technology resources for field use is a risk to the effective use of inspectors and quality, as data entry and inefficient means of communication requires inspectors spend additional time away from the project site.

Observation/Findings:

- Some Area Office inspectors have been provided with and are effectively using laptops with wireless cards that can be used on-site to input data in real-time to Site Manager. This resource provides access to online resources while recording and analyzing inspection data. This increases productivity and the accuracy of information and allows inspectors to spend more time on site verifying quality and quantities and to cover more area. Most inspectors however, do not have access to a laptop and must enter data at a computer work station or terminal located either at a project site or at the Area Office.
- Inspectors from the Area Offices enter Daily Work Report (DWR) information into Site Manager on a daily basis. This includes quantities installed, labor, material, and equipment used. Typically, the construction project manager checks the entries made and these inputs become the official project Diary entries. Site Manager compiles the data which is utilized for contractor payment at the end of the month.
- Quantities entered by the inspectors into Site Manager are utilized for monthly payments and are reconciled on a monthly basis with contractors before payments can be approved.
- Reporting from laboratory testing has not been incorporated into Site Manager. Laboratory test reporting is currently being tracked under an alternate software program. Districts would find it useful if Site Manager could be further developed to allow storage of specific testing information. TxDOT is considering developing the program to add a Laboratory Information Management System feature.
- Use of cell phones by inspectors is restricted and thus inspectors are often unable to establish direct contact with Area Offices and project managers. Lead inspectors are typically provided a radio in their trucks while most inspectors and can only be reached from another radio or a dual-band cell phone. Oftentimes, inspectors or supervisors are using personal cell phone numbers for project-related communication. As a result, communication with and between inspectors is difficult and often inefficient.

Impact:

The lack of adequate technology resources (primarily laptop computers and cellular phones) for field use to enter inspection data and communicate information will cause inefficient use of inspector time and could lead to less effective time spent at the project site verifying quality and quantities.

2.4 Audit Area: Project Delivery - Inspection	**2.4.3 Risk:** Adequacy of technology resources

Operational Strengths / Leading Practices:

- Some Districts and Area Office inspectors are able to utilize laptop computers with wireless cards for on-site data entry. This allows inspectors the ability to spend more time in the field visually inspecting construction and maintenance projects.
- Most private and public entities in the construction industry have access to cell phone and / or two way radios. This technology allows for better, more efficient communication between all parties involved in the construction process.

Conclusion / Recommendation for Improvements:

While Districts provide inspectors with the technology needed to perform their work, improvements in the type of technology could result in more effective use of the existing inspectors and enhance their performance. Increasing the number computers available in the field will ease data entry by inspectors and allow them more time for performing inspection work. Providing additional cells phone would allow for better coordination of field inspection activities.

- TxDOT should expand its effort to provide laptops with wireless cards to the inspectors. This technology resource is not currently available to most inspectors and widening the use of wireless laptops will improve efficiency. This hardware will automate the construction administration process for inspectors and increase productivity and accuracy of information and allow inspectors to cover more projects and area.
- The distribution of cell phones or two way radios will improve communication and provide inspectors with a more effective means of direct contact with the project manager, other inspectors and the contractor. Cell phones give the inspectors the ability to immediately contact the project managers regarding issues occurring on the project site and thereby mitigate potential delay or additional cost. Consider expanding the use of contract terms that require the contractor to provide dual-band cell phones for use on the specific project.
- Inspection sections should work with IR to further develop the Site Manager application so that it can track the results from laboratory testing. TxDOT is currently considering adding a module to Site Manager to incorporate the Laboratory Information Management System which would store all inspection and testing data in the same database for easy tracking and reporting.

3.0 Support Operations

3.1 Audit Area Support Operations – Human Resources

3.1 Audit Area: Support Operations – Human Resources	**3.1.1 Risk:** Employee recruitment and retention

Background:

The recruitment and retention of well qualified personnel has been expressed as a concern among many of the Districts. Career advancement and compensation appear to be the primary drivers of turnover Districts have also experienced difficulties associated with recruiting highly skilled personnel. The largest areas of concern regarding personnel shortages are for design engineers, maintenance staff and inspectors. The metro areas in particular have experienced significant difficulties in recruiting and retaining technical staff such as engineers and inspectors due to increased market competition. In addition, the salary structure appears to be somewhat linear across Districts and may not properly account for cost of living factors or competitive market rates. We identified this as a potential risk pertaining to TxDOT's ability to effectively maintain an appropriate work force, with regard to head count as well as experience/education, for managing its internal operations and executing its core functions.

Observation/Findings:

- We found that the common trends that affect TxDOT's recruitment and retention efforts are salary, location, and growth potential.
    - The salary structure is lower at TxDOT than for comparable positions in the private sector. For a significant number of entry and mid-level candidates, the lure of being paid more for the same responsibilities is a decision making factor in job selection.
    - Recruitment and retention is more of a challenge in the metro Districts where the market is flooded with job opportunities. Also, there appears to be an increased work load in metro Districts due to congestion and population growth. In smaller Districts, the issue that affects recruitment and retention is the attraction to working at the metro District, especially for young entry level candidates.
    - The current organizational structure within TxDOT is not conducive to a progressive career path and therefore potentially impacts recruitment and retention efforts. Refer to the "Effectiveness of Organizational Structure" section below for more details.
- The overall benefits package offered by TxDOT however is helpful in attracting and retaining personnel. There appears to be little effort by TxDOT to provide potential candidates information regarding the competitiveness of the overall compensation package offered by TxDOT when compared to the private sector.
    - However, the recent passing of the H.B. No. 2365 that affects future post employment benefits might further hinder TxDOT's ability to recruit employees into the organization.
- Some Districts mentioned that merit based increases have been reduced over the years. This makes it difficult for TxDOT to bridge, or even maintain, the current difference in salary structure between TxDOT and the private sector.
    - There is typically one merit increase every two years, which equates to about 3.5%. This merit increase of 1.7% per annum does not provide significant gains over inflation. Consequently, many employees perceive no substantial income gains from merit pay thus making outside employment more attractive. On the other hand, employees who do not receive any merit pay for good performance become disillusioned and also look to the outside for higher compensation relative to the work volume/expectation.
- The primary areas of concern most Districts have are in technical fields such as engineering,

3.1 Audit Area: Support Operations – Human Resources	**3.1.1 Risk:** Employee recruitment and retention

maintenance and inspection.

  - We found that a primary issue for recruiting entry level positions is the focus of most potential candidates on the starting salary offered and not on the benefits TxDOT offers.
  - Experienced candidates being recruited for mid-level positions have a greater appreciation for the benefits TxDOT offers.

- A common concern for a number of Districts is the difficulty in recruiting maintenance drivers due to TxDOT's requirement for a Class A Commercial Driver's License (CDL).
  - There have been changes to the policy which now allows drivers to be hired on a provisional basis and must obtain their CDL within a certain time period of employment.
  - There is a large demand for drivers with CDLs in the private sector. Therefore, once these drivers have obtained their CDL, it is difficult to retain them with the higher salaries being offered in the private sector.
- Certain Districts believe that there is a public perception that it is hard to get hired at TxDOT due to the cumbersome hiring process. Some of challenges described include: difficulty in finding TxDOT job openings, the lack of job openings listed on search engines such as "jobs.com" and the length of time required prior to job offers being made. There is no plan at either the District or Division level to change that perception and market TxDOT careers more aggressively.

Recruitment Initiatives

TxDOT has implemented several recruiting initiatives, including the following:

- Rapid Hire Program: In lieu of the formal hiring process, this initiative allows HR and functional supervisors to screen applicants at job fairs and speed up the hiring process. This is especially helpful for maintenance recruits who do not tend to wait for long periods of time to get hired.
- Internal Referral Program: Employees get a paid day off for assisting in the hiring process.
- TxPrep: Program for middle school kids to educate them about TxDOT careers.
- Internships and Co-op programs that help recruit college and high school students.
- Tuition assistance programs to educate current employees and recruit new talent into the organization such as the Conditional Grant Program. This program pays up to $3,000 per semester for high school and college students to earn engineering or information technology degrees after which they work with TxDOT for two years.
- TxDOT also teams with local universities on research programs and builds eminence within the student body.
- To account for low salaries, candidates are sometimes hired at a higher job level that offers better salaries.

Retention Initiatives

Apart from the benefits package the main advantages of a TxDOT career include stability and job security. TxDOT and certain Districts have additional initiatives in place to retain the organization's workforce.

- A statewide study was recently conducted to evaluate parity in salaries within each job classification and the number of years of service among Districts. TxDOT then allocated additional money to the Districts to alleviate the parity issues that were identified.
- Certain Districts have special recognitions that are handed out at supervisor meetings to build

3.1 Audit Area: Support Operations – Human Resources	**3.1.1 Risk:** Employee recruitment and retention

morale.

  - Usually these recognitions include non-monetary awards - plaque/certificate/lunch.
  - These are not project specific awards but recognition for general performance.

- The Administration Department also presented a comprehensive view of benefits to highlight the competitive overall package compared to the private sector.
- We also found that particular Districts have adopted a policy where 'they pay those they cannot afford to lose'. These individuals always get a merit increase to keep them within TxDOT.
- Inspectors' rates have been raised using merit pay to help retention and to adjust to market conditions.
- Inspector mentoring programs are being instated in many Districts.
- Rotational programs, implemented by Districts encourage young engineers to rotate between different design teams to gain a wide variety of experience described in detail, offer excellent training to young engineers.
- There is a general perception that training 'boot camps' have helped with retention.

Impact:

There is the potential risk of TxDOT losing a significant portion of its institutional knowledge in a few years when about 70% of executive managers and about 27% of all current employees will be eligible for retirement. Compounding this is an expanding private market with higher salaries. Failure to institute sufficient recruitment and retention programs could impact the following:

- The attrition of personnel due to better remuneration and growth potential in the private sector;
- The quality of services provided by TxDOT due to insufficient experience and knowledge of new employees;
- The effectiveness of consultant management due to lack of project management and technical skills; and,
- The overall organizational structure due to attrition of technical skills to the private sector.

Operational Strengths / Leading Practices:

TxDOT has received high marks from all Districts with regards to the wide array of training opportunities, including educational and professional courses. Maintaining this program while expanding in other areas, such as mentoring, should increase employee satisfaction and retention.

- Several Districts have implemented comprehensive mentoring programs. The goal of these programs is to ensure that there is a line of succession in-place as more senior personnel leave TxDOT. In addition, it provides junior personnel with a better understanding of the growth potential within TxDOT.
- TxDOT's analysis of salary parity within Districts assisted in leveling the playing field for all employees.
- Societies comprised of junior level personnel such as the Young Engineers' Group, have the benefit of being run for and by junior personnel allowing more effective sharing of issues.

3.1 Audit Area: Support Operations – Human Resources	**3.1.1 Risk:** Employee recruitment and retention

Conclusion / Recommendation for Improvements:

As a public entity, salary expectation is typically lower for TxDOT employees than for equivalent positions in the private sector. The additional benefits TxDOT offers can help to close the overall compensation package inequity. In spite of TxDOT's strong benefits package, many employees still tend to focus on the issue of salary as an area for improvement. Areas to consider include:

- TxDOT should work to change the public perception about careers within the organization. A more aggressive marketing campaign would highlight the advantages of a TxDOT career and attract new people into the organization.
- Benchmark salary and benefits to equivalent positions within the private sector and make adjustments in areas where there are significant discrepancies. One District we interviewed is already benchmarking compensation for engineers within their District and the private sector. This could be expanded to include all fields and all levels of personnel.
    - Annually report the findings of the benchmarking study to illustrate the desirability of the overall compensation package TxDOT offers.
- Conduct employee surveys to determine areas requiring improvement. Distribute the survey results and the steps being taken to rectify the issues.
- Develop alternative ways to recognize employees at all levels for outstanding performance both internally and externally and strengthen existing programs such as paid leave for outstanding performance. Provide project specific recognition to employees with significant contributions to successful projects that have been completed on-time and under budget.
- Other existing programs such as flexible work schedules and telecommuting opportunities should be leveraged more often to aid in TxDOT's recruitment and retention efforts.
- Continue to offer extensive training opportunities as well as comprehensive and varied work experiences, including a job rotation program that may include District/Division exchanges of personnel.
- Create an active mentoring program to assist in guiding junior personnel through their careers. Work with promising junior level employees to identify and illustrate job growth opportunities.
- Societies already in place could be expanded to serve as representative body over Districts and Area Office employees addressing questions and concerns.

3.1 Audit Area: Support Operations – Human Resources	**3.1.2 Risk:** Appropriateness of statewide FTE allocation

Background:

There appears to be a recent trend of reducing the number of Full time Equivalents (FTEs) within public organizations as mandated by the legislature. Based on this trend and the increase in overall construction volume in the recent years, we identified the FTE allocation as a potential risk to TxDOT. A lack of sufficient FTEs and/or the inefficient utilization of existing FTEs may have a significant impact upon the efficiency and effectiveness of TxDOT's field operations.

Observation/Findings:

FTE Allocation

- FTE allocation for TxDOT is legislatively mandated. The allocation of the FTEs to the District is an internal process conducted at the Division level.
    - There have been several legislatively mandated reductions in the number of TxDOT FTEs over the last few years.
    - As construction output continues to increase, Districts believe that they lack sufficient FTEs to keep pace with the growth. Services such as Inspection are particularly affected by the lack of FTEs since this service must be performed in house.
- The statewide FTE allocation does not address changes Districts have experienced in the last few years or the special requirements of specific Districts.
    - While certain Districts have experienced significant population growth and congestion resulting in increased work load, other Districts have experienced a reduction in population densities.
    - We found that some Districts have unique operational requirements, such as ferry operations, that are unaccounted for in the FTE allocations. The allocations to these Districts when compared to equivalent Districts without the unique operations are similar.
    - Certain Districts with similar construction dollar output have significantly different FTE allocations.
- Districts have the ability to redistribute the FTEs within their departments. As a result, large numbers of FTEs in support operation positions were reallocated to other departments with more critical needs during the legislatively mandated FTE reduction.
- Districts are expected to maintain active personnel for all FTEs allocated. Districts that do not maximize their FTEs could potentially lose their allocation.
    - With significant turnover in all fields, many Districts are constantly trying to meet their FTE cap.
- At least one District hires more personnel than their FTE cap to account for attrition.
- The recent trend to downsize mandated by the required reduction of FTEs and the mandated increases in consultant work bears the risk of changing TxDOT's focus from that of an engineering organization to that of a project management organization.

Resource Allocation

FTE allocations to the Districts are set by Division and are typically based on historical headcount requirements. As business volumes and activities evolve over time it is not clear if there has been

3.1 Audit Area: Support Operations – Human Resources	**3.1.2 Risk:** Appropriateness of statewide FTE allocation

an attempt to reevaluate staffing needs and allocations.

- There is a concern expressed at the Districts that, while business activity have been increasing, work is being performed with the same headcount they have historically been allocated. Likewise, in Districts where business has been soft, the headcount remains the same.
- Also, while resources may be shared across the Area Offices within a District, there does not appear to be a mechanism to share resources between Districts. For example, it was noted that inspectors in some Districts are over-scheduled, while other Districts with fewer projects may have excess inspector capacity.
- Districts seemed unaware of any special metrics that were being used to determine workload per FTE. As an example there is no tracking system in place to determine the number of projects inspected per inspector.

Shared Services

- We learned that, while there has been an increased level in the use of consultants for design work, there may exist an opportunity to increase outsourcing of non-core business functions. This could include facilities maintenance, equipment maintenance (legislature mandates 50% of this is outsourced currently) and training among others.

Impact:

The lack of sufficient FTEs and/or the inefficient utilization of existing FTEs could impact or compromise the following:

- The underutilization of available FTEs due to lack of appropriate resource allocation, tracking and sharing; and
- Inefficient utilization of outsourcing non-core business functions.

Operational Strengths / Leading Practices:

- Districts should continue fine tuning the distribution of FTEs within their departments.
- Many public and private sector organizations have found that outsourcing certain business functions has led to greater efficiencies and a higher level of customer satisfaction.

Conclusion / Recommendation for Improvements:

Since FTE allocations are legislatively mandated, TxDOT does not have much control on the allocation process and the FTE caps. However, it would be worthwhile for TxDOT to conduct an analysis that takes into account growth over the last few years and the costs and benefits of performing work in-house as opposed to outsourcing the work and present its FTE needs to the legislature for consideration. Other areas to consider include:

- Reevaluate FTE distribution across the Districts to ensure that allocations are in line with changing demographics and needs.
    - This should include a review of the statewide FTE resource staffing formula based on construction dollar volume, number of construction and maintenance contracts, daily vehicle miles, population and similarly important business workload drivers.
- TxDOT should evaluate the current job market and determine potential solutions for becoming more competitive. Alternate solutions such as increasing compensation for key positions, or

3.1 Audit Area: Support Operations – Human Resources	**3.1.2 Risk:** Appropriateness of statewide FTE allocation

giving employees the option to choose a higher pay structure with diminished benefits may help retain high performing individuals and enable the Districts to determine the best structure to suit their need.

- We suggest that a state-wide review of resource allocations be performed. This would include identifying business workload drivers such as, dollar volume and number of inspections. Following a review, high business volume Districts might be allocated additional resources where understaffed while slower business Districts might lose headcount. Potentially, there could be a pool of scarce resources ("residing" at Division) that could be deployed to high volume, high demand Districts during periods of need.
- We recommend that TxDOT evaluate opportunities for either outsourcing or creating shared service offerings for certain business functions. This may create opportunities to reallocate resources to higher value activities with the organization.

3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure

Background:

A legislative mandate requires an eleven to one staff to supervisor ratio (11:1). Based on our discussions, this mandate appears to create inefficiencies within the Districts. This structure appears to be hindering the potential for career advancement and as such, is reported to have a negative effect on employee morale and contributes to staff turnover.

Observation/Findings:

11:1 Staff to Supervisor Ratio

- The legislatively mandated 11:1 ratio appears to potentially restrict the Districts' ability to change the current organizational structure.
- Additional intermediate management positions cannot be created and in certain instances, employees who were supervisors were downgraded to lead workers.
    - Apart from negatively affecting the morale of the employees that were demoted, typically from supervisor to lead worker, the demotion also removed their responsibility to conduct performance reviews for workers that they supervised.
    - Existing supervisors are now expected to carry the performance review loads and conduct performance reviews for employees with whom they have had limited interaction.
- Limiting the number of supervisory positions has in turn limited job growth opportunities for employees. This is particularly true when an employee holds the same supervisory position for an extended period and non-supervisory employees have no upward mobility in that section.
- It was also observed that certain Districts do not feel that the 11:1 is significantly impacting any of their operations.
- The potential for career growth for personnel with technical expertise who may not want to progress toward a management or supervisory role may be limited due to a lack of alternate, skill based career paths.

Project Staffing

- For the most part, the third party consultants work separately and apart from their counterparts at the Districts. While a fully staffed "team" may consist of both TxDOT employees as well as consultants, the two groups do not always collaborate until certain planned review stages of the project.

Project Management

- Based on the observations with regards to recruitment and retention, FTE allocation and the organizational structure, there is an overall pressure to downsize mandated by the required reduction of FTEs, and outsource more of the core functions within the organization.

TxDOT Districts, Texas COGs and MPOs

- Certain activities performed by the TxDOT Districts are similar to those performed by the Texas COGs and MPOs. During the course of our review it was indicated that there may be opportunity to improve coordination, resource sharing and communication between these three organizations.
- COGs perform a variety of duties beyond transportation planning. They can provide housing,

3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure

homeland security, elder care, regional transit and other community programs. COGs containing urban areas and/or MPOs generally have robust transportation programs with engineers and designers on staff. Rural COGs, however, frequently have limited transportation programs if they have one at all. COG programs are funded by membership dues (local government entities), some state funding, as well as state and federal grants. Transportation planning and project coordination are only part of the services COGs deliver. Their overall mission is to provide local government with support in planning for the future.

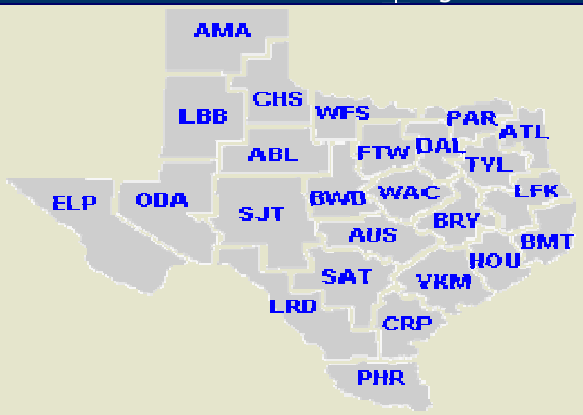
- MPOs are designated for all urbanized areas with populations greater than 50,000 people. They approve the use of federal funds within the urban area, and create long and short range transportation plans. MPOs were authorized by the Federal Highway Act of 1962 and are currently operating under the TEA-21 Act in 1998 by Pres. Clinton. MPOs focus exclusively on transportation planning and project coordination.
- The table below outlines the similarities and differences in the duties performed by the Districts, COGs and MPOs. Districts are responsible for planning, building, operating and maintaining roads. COGs perform planning, design, and project coordination for the region. MPOs perform planning, design and project coordination for the assigned urban area only. Sometimes the COG and MPO are one organization, depending on the region. Please note that Local Governments maintain their own roads, even though the COGs do not perform that duty.

Duties	TxDOT District Office	TxDOT Area/Maintenance Offices	COGs	MPOs
Planning/Design	Yes	Yes	Yes	Yes
Project Coordination	Yes	Yes	Yes	Yes
Operation	Yes	Yes	No	No
Maintenance	No	Yes	No	No
Community Services	No	No	Yes	No

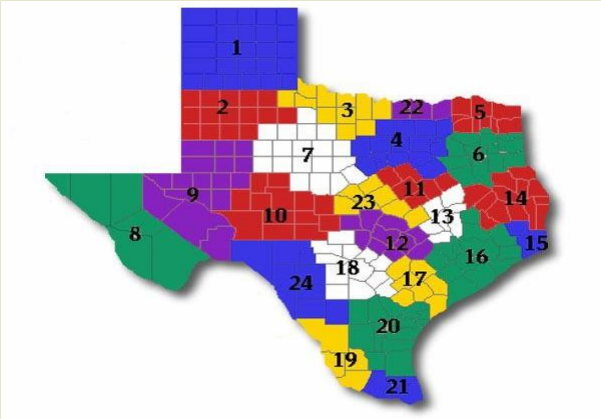
- As can be seen by the chart above, there is overlap with regard to the planning/design and project coordination activities being performed by TxDOT, COGs and MPOs. Each organization has their own set of resources dedicated to these activities and there may be unnecessary duplication of efforts due to lack of communication or interagency planning.
- Additionally, there are slight geographical differences between the TxDOT Districts, COGs and MPOs. The current boundaries between Districts and COGs are similar (differing counties here and there), therefore, geographically it would not be difficult to re-align Districts along COG boundaries. See Maps the maps below illustrating the boundaries of the TxDOT Districts, COGs and MPOs.

TXDOT Districts (25)

3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure

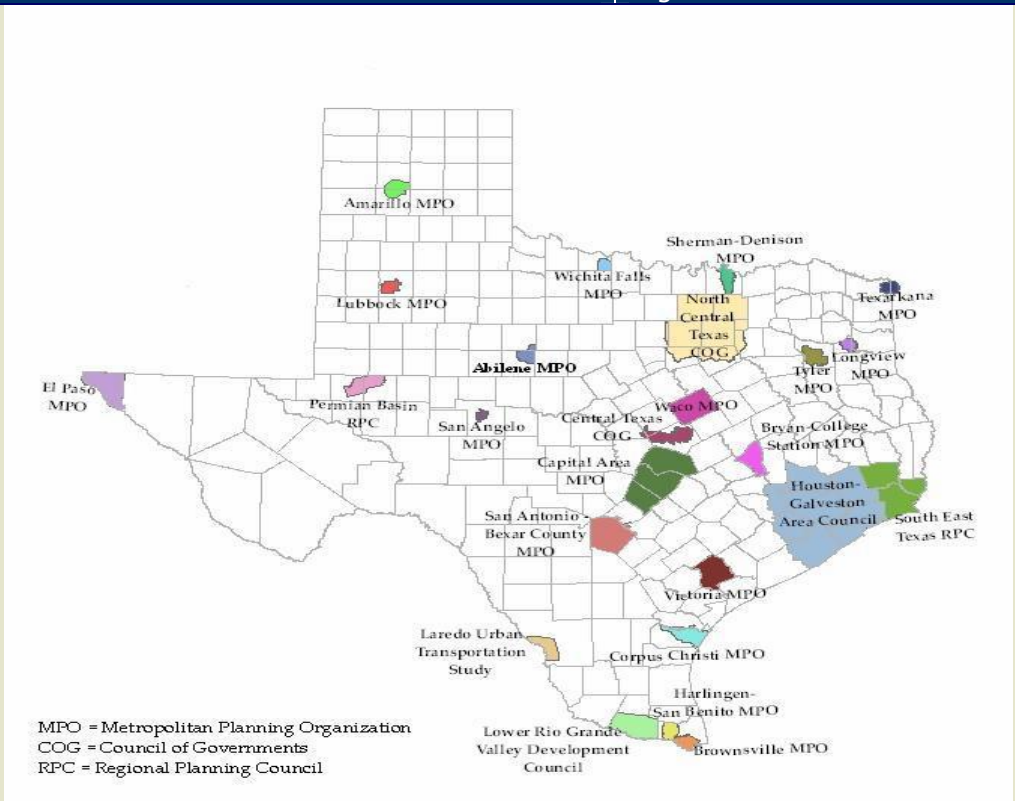


Texas COGs (24)



Texas MPOs (25)

3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure



3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure

Impact:

The current 11:1 ratio impacts the growth potential of employees and increases the risk of attrition and loss of institutional knowledge. Additionally, in certain instances, managers may be required to perform a large number of employee reviews. This may create a large workload for certain managers and it may impact the quality of feedback provided to staff level employees.

Operational Strengths / Leading Practices:

- A few states are beginning to re-evaluate job classifications for state employees to ensure the existence of technical skill-based career paths. These paths do not require that an employee obtain supervisory responsibility to gain advancement and provide incentives for state employees to broaden their technical knowledge and skill base.
- Many leading organizations co-locate multidisciplinary teams throughout the project lifecycle. This fosters a higher degree of collaboration and knowledge sharing. Many organizations have moved to a "hoteling" office model in which multiple workers share a single office space. This is done in recognition that many of them will be assigned to team room environments and to allow for some of the existing office space to be reconfigured to create larger meeting rooms to accommodate teams.
- Some states have already started focusing on more project management responsibilities and have begun realigning their organizational structure and training personnel.

Conclusion / Recommendation for Improvements:

Similar to the FTE allocation issue, it would be beneficial for TxDOT to conduct a study on the mandated 11:1 ratio, report the positive and negative impacts, and determine the effectiveness of the policy. Presenting the findings to legislature may create an opportunity for policy revision. Other areas to consider include:

  - Altering roles and responsibilities of lead workers to include performance reviews of certain employees, thus reducing the burden on supervisors and providing intermediate job growth potential to workers;
  - Reevaluating supervisory needs in different departments and allocating more supervisors in critical functions; and
  - Allowing the Districts more flexibility in determining staffing and supervisory requirements.

- We suggest that Districts explore co-locating internal resources and consultants. This could be done initially for large projects were there are many different development elements contemplated. Co-locating will help to enhance communication and knowledge sharing to ensure that projects are developed utilizing a common vision and goals. We also suggest the TxDOT explore ways of freeing up office space at the Districts to allow for building out meeting rooms to accommodate co-locating project teams.
- The recent trend to reduce FTEs and increase outsourcing is changing TxDOT's focus from that of a typical engineering organization into that of a project management organization. Most Districts we interviewed do not appear to have a plan to assume greater project management responsibilities. TxDOT should:
  - Develop and introduce policies and procedures to address the shift in roles and

3.1 Audit Area: Support Operations – Human Resources	**3.1.3 Risk:** Effectiveness of organizational structure

responsibilities of the organizations;

- Various training programs are conducted by the Contract Services Offices regarding contractual documents, oversight and monitoring. TxDOT should strengthen these training efforts and continue developing Project Management skills within the organization to support management of outsourced work.

TxDOT Districts, Texas COGs and MPOs

- In some cases, TxDOT, COG and MPO responsibilities and activities overlap and we believe there may be an opportunity to improve communications and streamline business processes through some consolidation and/or coordination of redundant functions. For example, in urban areas, TxDOT Area Offices may be performing planning and design work similar to that of the local COGs. A case study should be undertaken to identify the specific areas of overlap between TxDOT, COGs and MPOs throughout the state and to evaluate the most appropriate organizational structure and resource allocation for executing any redundant work. An improved organizational structure and coordinated alignment of responsibilities could help to improve communication, streamline the decision making process, and improve the overall efficiency of the work performed by TxDOT, COGs and MPOs.
- The current geographical structure of the TxDOT Distircts and the COGs should also be evaluated. Aligning the boundaries of these two organizations could improve coordination and streamline planning efforts. Currently the boundaries are very similar; therefore, large-scale geographical changes would not be required.

3.1 Audit Area: Support Operations – Human Resources	**3.1.4 Risk:** Efficiency of knowledge sharing and resource sharing between Districts

Background:

To a certain degree, there is sharing of human resources between Districts; however, it is an informal process. There is no established mechanism in place for communicating resource availability or needs. For example, some Districts have shared design engineers with other Districts when appropriate opportunities present themselves; however, the communication process for doing so appears to be ad hoc. There is a risk of inefficiently using the already limited resources within TxDOT.

Observation/Findings:

- Sharing of information between Districts is an informal process apart from the conferences and meetings conducted on an annual or bi-annual basis.
- Current sharing opportunities consist of the following:
    - Statewide conferences and meetings.
    - Functional specific meetings are conducted and provide functional Directors an opportunity to discuss topics pertinent to their specific function.
    - Most personnel are comfortable obtaining information from known and trusted sources and rely on personal relationships with regional Districts.
- Sharing is more likely to occur regionally than on a state-wide level.
- There is no formal platform for Districts to share ideas, concerns, best practices, scheduling tools and other information. Most of the information is conveyed by emails, telephone and verbal communication.
    - Therefore innovative practices are sometimes not adopted statewide and additional efforts are required when several Districts are developing similar solutions.
    - Similarly there is no unified source that discusses issues and solutions faced by Districts that can act as a "Lessons Learned" for other Districts facing a similar situation.
- Sharing resources between Districts is extremely rare with the exception of certain specialized technical fields. Such fields as hydraulics and bridge design require Districts to share resources.
- There appears to be no platform for Districts to communicate resource status, whether it is needs or excess capacity. Also, most Districts do not see the need to share resources across Districts and rely on consultants for overflow work.

Impact:

Not having a single platform for Districts to share experiences, challenges, lessons learned and best practices causes all Districts to 're-invent the wheel' while dealing with impediments that other Districts might have already encountered and resolved. With a lack of FTEs, not sharing resources across Districts causes an inefficient utilization of already limited TxDOT resources.

Operational Strengths / Leading Practices:

The most effective distribution of information currently occurs through a network of personal

3.1 Audit Area: Support Operations – Human Resources	**3.1.4 Risk:** Efficiency of knowledge sharing and resource sharing between Districts

relationships. By increasing the number as well as the depth of relationships, the dissemination of knowledge will provide more effective and efficient processes.

- TxDOT has embraced sharing resources between Districts for certain functions such as design, purchasing, and regional sign shops. The Administration also encourages the Districts to share resources when workloads transition within different areas of the state.
- TxDOT's learning content management system, referred to as the "i-way", is primarily used for on-line training but is effectively being used to capture knowledge. For example a pavement forensics project has been completed using this system.
- The existence of societies, learning opportunities, and conferences are prime channels to distribute information.

Conclusion / Recommendation for Improvements:

Sharing information and resources across Districts would potentially increase the efficiency of operations through sharing lessons learned, best practices, solutions and management tools. Additionally, sharing would effectively utilize the limited FTE resources available to the organization by tracking and recognizing changing needs and availability. Areas to consider include:

- Focus on radiating levels of distributing information, starting with intra-District, neighboring Districts, Regions, and concluding with statewide distribution.
- Creating a unified platform to promote the communication between Districts and Division. This may include monthly emails, newsletters and a web based solution.
- Developing a system to track and manage work loads across Districts.
- Create instances for personal networking to establish more cross-District and Division interaction and relationships.
- Perform follow-up to determine if recommendations are implemented and to analyze their impact.
- The utilization of the "i-way" system should be further expanded to include the capture and transfer of institutional and external knowledge.
- Statewide meeting and conferences would be conducive to sharing high level information, due to the format and frequency of these meetings. Meetings and conferences should be conducted more frequently in order to discuss best practices, lessons learned and solutions in greater detail.

3.1 Audit Area: Support Operations – Human Resources	**3.1.5 Risk:** Efficiency and effectiveness of IR systems

Background:

PeopleSoft is a relatively new system within TxDOT and appears to be functioning well. However, there are concerns regarding its ability to interact with TxDOT's older legacy systems.

Observation/Findings:

- Overall, we have learned that HR Online, a PeopleSoft product, works well as a stand alone system. Most District HR personnel appreciate the user friendly interface and ease of the system.
- The only issue is that HR Online does not interact with systems such as SiteManager, SES and SLD that manage employee time.

Impact:

The lack of interaction between HR Online and other legacy IR systems potentially impacts the tracking and management of finances and resources.

Operational Strengths / Leading Practices:

- The new HR system has been well received by most Districts and appears to be meeting the needs of TxDOT.

Conclusion / Recommendation for Improvements:

- Explore potential for integrating the HR system with other legacy systems.

3.2 Audit Area: Support Operations – Accounting/Finance

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.1 Risk:** Project budgeting and cost controls

Background:

This topic was part of our original scope; however, to improve the efficiency of our review we have consolidated this topic into the Project Development – Planning section. The Transportation Planning and Development Department (TP&D) has primary responsibility of developing and managing construction cost estimates and budgets; therefore, we have included a detailed discussion of this topic in Section 1.1.2 Project Development – Planning: "Consistency and effectiveness of project budgeting and cost controls."

Though all Districts are preparing project budgets, it does not appear that all Districts are consistently monitoring and tracking project progress against their budgets. Standardizing and strengthening cost estimating controls can help to reduce the risk of cost overruns and associated funding difficulties. Budgets are updated on a yearly basis; however, the level of detail of the update and review of project budgets is inconsistent and varies among the Districts. A clear process has not been developed to identify metrics or benchmarks to determine the overall level of project performance. Contingencies, including escalation factors that account for "unknowns" particularly in the early phases of project development, are not consistently included in project construction cost estimates.

Observation/Findings:

This topic has been addressed in detail in the Project Development - Planning section. Please see the "Consistency and effectiveness of project budgeting and cost controls" risk within the Project Development - Planning section (1.1.2) for further details.

Impact:

Please see the "Consistency and effectiveness of project budgeting and cost controls" risk within the Project Development - Planning section for further details.

Operational Strengths / Leading Practices:

Please see the "Consistency and effectiveness of project budgeting and cost controls" risk within the Project Development - Planning section for further details.

Conclusion / Recommendation for Improvements:

Please see the "Consistency and effectiveness of project budgeting and cost controls" risk within the Project Development - Planning section for further details.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.2 Risk:** Efficiency of legacy IR systems

Background:

Several Districts have expressed issues and concerns with the Financial Information Management System (FIMS). FIMS is a legacy system that interacts with various other subsystems. Information pertaining to human resources, payroll, equipment usage, materials and supply, budget, contract, and design and construction all feed into FIMS. A number of Districts have developed in-house, independent spreadsheets where data gathered from various IR systems is manipulated to achieve desired information in a useable format. There may be opportunity to improve efficiency and effectiveness accounting IR systems.

Observation/Findings:

Many of the IR accounting issues are similar to those identified with other legacy systems. The IR accounting systems do not interact with one another and comprehensive reports cannot be created as desired. For example FIMS cannot pull data from the Automated Purchasing System (APS). In numerous instances, information must be extracted from various sources and many Districts are developing their own applications to create aggregate reports. The Deloitte FAS team evaluating Auditable Unit D - Management and Support Functions, will be providing more detailed findings related to FIMS. Specific observations regarding potential IR improvements are listed below.

Budgeting Process

- Districts are responsible for creating and maintaining biennium operating budgets. The budget amounts are then allocated to the Area Offices by the Districts. At the District level, management reports with budget and actual data are prepared for supervising management.
- District accountants must create manual Excel spreadsheets to provide management with the information it needs to understand the organization's performance. While the Budget Reporting system generally has adequate functionality, the "drill down" capabilities are restricted to only a few individuals in the accounting department. As a result, those individuals in the departments who are directly responsible for budget performance must contact the accounting department to create special reports rather than performing their own analysis. While Division makes standard reports available monthly, Districts would like the ability to create their own reports at their convenience.

Inventory Control

- During our interviews, some of the aspects of controlling fixed asset inventory were brought to our attention. The accounting staff are responsible for monitoring fixed assets in the Minor Equipment System (MES) application, including minor equipment and items:
    - Greater than $5,000;
    - Lab equipment of any cost;
    - Computer equipment greater $500; and,
    - Other informal items such as phones, radios, cameras and other items with values of less than $500.
- There is not a bar code system in place to assist with counting and monitoring equipment which is often moved between departments within the District.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.2 Risk:** Efficiency of legacy IR systems

Impact:

Budgeting Process

The inability of direct users of information to perform ad hoc reporting and analysis is less productive than giving them the tools and access to perform this function. Additionally, using the accounting department to perform detailed analysis is less efficient than having the individuals closer to the operations performing this function.

Inventory Control

The total number of inventory categories appears to be rather large for an organization of TxDOT's size and could require an excessive control for the ultimate value received. Using simple tools such as bar coding could help with monitoring asset location and result in more efficient annual reviews required by the accountants.

Operational Strengths / Leading Practices:

Budgeting Process
Leading organizations allow users to access their budget and current data directly using on-line access capability. This reduces the demands on the accounting department and gives operational management the ability to receive more timely and relevant information to make decisions.

Inventory Control

Leading practice companies periodically review their fixed asset policies to determine the appropriate levels and dollar thresholds for including in fixed asset monitoring and reporting. These companies also employ advanced technologies including RFID or bar coding to make monitoring assets more efficient.

Conclusion / Recommendation for Improvements:

The systems currently in place are functioning and accomplishing their overall goals; however, there is an opportunity to increase efficiency by updating these systems. Improved reporting features and querying abilities will help supervisors manage budgets and assess performance. TxDOT should explore the potential for implementing new accounting IR systems. TxDOT should develop a business case evaluating the current costs for maintaining the current IR systems including hardware, software, development costs, and personnel costs in the field and at Division against the cost of implementing new systems and the associated benefits and efficiency gains.

Budgeting Process

The IR access policies should be revaluated to ensure they are meeting the needs of TxDOT management. Providing supervisors with access to pertinent information related to their departments would enable supervisors to monitor key data and make informed, consistent decisions. Since the automated tools with drill down capability exist, Division should explore ways to make this functionality available to more users in the Districts.

Inventory Control

We suggest that a more detailed review of the fixed asset system be performed. This would not only include a review of the policies for monitoring assets but also investigating modern tools such as bar coding for tracking/counting assets.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.3 Risk:** Efficiency and accuracy of payroll collection data

Background:

Based on discussions with several Districts, there seem to be inefficiencies in the timesheet reporting function. Time is tracked on a daily basis, but is submitted for approval by the accounting department on a monthly basis. Additionally, there are inconsistencies in the time entry process. Some of this is done electronically, while some is done on paper and then manually entered into the time reporting system.

Observation/Findings:

- The District and Area Offices are responsible for compiling information required for payroll time reporting and for allocating time to specific projects (job cost reporting) for all levels of the organization. The processes used to report payroll time and time for specific job costs are unrelated, separate efforts requiring duplicate data entry.
- The process used for job cost reporting is tedious and the results are prone to error. The Districts and Area Offices have developed manual Excel spreadsheets to collect initial job cost data from the workers and this data is re-input into the Salary & Labor Distribution System (SLD) and Single Entry Screen System (SES) systems weekly and monthly by Administrative Techs.
- Payroll is reported using a different process. Reconciliations between all of these different systems must be performed to ensure they are in balance. Due to the length of time required to process job cost data and the unreliability of the information, the outputs are either not used or are not accepted by the users. As such, Districts and Area Offices do not regularly use this information to run their businesses. We also observed that the reports generated from these systems are not timely and are generally not confidently used by District and Area management.
- Personnel job related expenses are reimbursed through a different process. Separate warrants are created to reimburse employees for their job related expenses.
- Currently some of TxDOT's legacy systems including FIMS, MMIS, MSMS, and EOS do not have the ability to enter fractional work hours. TxDOT has evaluated the potential for modifying the system to account for fractional hours; however, the initiative has not been approved due to cost considerations associated with the upgrade.

Impact:

The risks associated with this type of data collection are many and include:

- Potential for data entry errors with multiple people handling the information at different times;
- Sacrifice the timeliness of data entry and reporting;
- Error prone reports;
- Lack of reliable and timely management reports; and,
- Inefficient use of resources required to maintain the entire payroll and job cost reporting systems.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.3 Risk:** Efficiency and accuracy of payroll collection data

Operational Strengths / Leading Practices:

- Many organizations, both public and private, have implemented Enterprise Resource Planning (ERP) type of payroll systems. These applications are designed for data entry to be performed once (usually directly by the employee) and to populate other related applications, e.g. Job Cost with the same data. Exception reporting is typical, e.g. only enter time different than the standard of 8 hrs. per day. Expenses are reimbursed through direct deposits.

Conclusion / Recommendation for Improvements:

- There is an excellent opportunity for TxDOT to explore implementing a system-wide Enterprise Resource Planning (ERP) system that includes capturing hours and time expended performing certain job tasks. While we did not specifically review the adaptability of the legacy system to allow for streamlining the data entry process and capturing job cost information, older mainframe systems are not typically designed to accommodate some of the newer types of data capture and transactions.
- To the greatest extent possible, payroll as well as expense reimbursement payments should occur through direct deposits minimize paperwork and improve processing efficiency.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.4 Risk:** Rationalization and consolidation of Accounting Functions and resources

Background:

The organizational structures of most Districts consist of Accounting/Finance departments both in the Districts and at the Area Offices. Based on discussions with various Districts, we believe that with new technology systems and streamlined processes, there is an opportunity within the District Finance/Accounting departments to consolidate and reallocate accounting resources.

Observation/Findings:

Accounts Payable Processing

- During the course of our interviews of District accountants explained the process by which accounts payable are managed:
  - The District receives a vendor invoice and enters it into a system;
  - The invoice is sent to Finance Division to be sent to the Comptroller to pay the vendor;
  - The Comptroller either issues a direct payment to the vendor or cuts a check (warrant) which it forwards to Division;
  - The Finance Division then sends the check (warrant) back to the District; and,
  - The District mails the check (warrant) to the vendor.
- We also learned that the vendor master file used throughout the state lacks completeness and accuracy. There is no single master file used across state agencies and different agencies maintain their own master files for vendors. State-wide purchasing contracts negotiated by GSD and TBPC all have different coding systems for vendors.

Managing Payments for Damage Claims (Accounts Receivable)

- Districts are responsible for collecting monies from third parties for damage done to public roadways and bridges. For the Dallas District this amounts to $30,000 to $50,000 per month and some of the claims could be hundreds of thousands of dollars if, for example, a bridge is damaged.
- Districts are responsible for determining the damage claim amount as well as billing, collecting and periodically depositing the payments from third parties in a bank account. There is a web based application that is used to help with this process.

Impact:

Current accounting practices may lead to inefficiencies related to processing vendor invoices. This process may utilize unnecessary resources and therefore negatively impact productivity of accounting personnel.

The current system for managing payments on damage claims may require more time than necessary to process claims. Efficiencies may increase the risk of collecting claim payments in a timely manner.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.4 Risk:** Rationalization and consolidation of Accounting Functions and resources

Operational Strengths / Leading Practices:

Accounts Payable Processing

- The construction industry is more frequently insisting that, in order for vendors to conduct business, the vendor shall establish a direct payment mechanism. This reduces the expensive process of cutting and releasing checks and allows for efficient use of human resources and financial resources. While it is unlikely that all vendors will be able to set up automatic payment facilities, the intent is to convert a majority of vendors to improve payable efficiencies.
- Leading organizations maintain a single vendor master data base, which allows them to assess vendor performance and to negotiate favorable rates.

Managing Payments for Damage Claims (Accounts Receivable)

- The amount of a claim is determined by the District, where the most knowledge of the extent of damage resides.
- Many large organizations have a treasury function that is responsible for overseeing cash collections and investments.

Conclusion / Recommendation for Improvements:

Accounts Payable Processing

- District offices are responsible for processing vendor invoices for supplies and services. While our review of this process was limited, it appears there may be an opportunity to reengineer this area to realize greater efficiencies and cost savings by reducing the amount of paper handling and allowing for more timely and efficient vendor payments. TxDOT should consider developing a business case analyzing the impacts and benefits associated with a new accounting system and streamlined processes.
- Standardizing the vendor numbering systems will allow state agencies to gain a clear understanding of the volume of purchases from vendors and vendor performance state-wide, thus potentially improving the negotiation position on master purchase contracts.
- The vendor invoicing process is a prime candidate for streamlining to make it more efficient. Steps in the process could be eliminated with the possibility of requiring vendors to directly submit invoices to Division. Division would then create a check request report, requesting that the Comptroller make a direct deposit to the vendor's bank account or mail the warrant directly to the vendor. A record of payment could also be provided to the District. This process would reduce the number of accounting resources throughout TxDOT. This is the same concept as having a "shared service" dedicated to processing invoices, which is generally more practical than having this function performed by multiple entities and at multiple locations. Proper controls should also be established to verify that the work has been performed or that the goods have been received by the local District.
- A complete flow chart of the Accounts Payable process review should be developed and analyzed to identify activities and tasks that could be modified or deleted.
- An effort should be undertaken to standardize the vendor master information across state agencies. Reports of the volume of vendor purchases should be used to assist with negotiating master agreements with the greatest discounts available.

3.2 Audit Area: Support Operations – Finance / Accounting	**3.2.4 Risk:** Rationalization and consolidation of Accounting Functions and resources

Managing Payments for Damage Claims (Accounts Receivable)

- While we believe that it is important for the Districts to be involved with claim calculations and determination of damages, their continued role in billing, collecting, applying cash receipts and depositing monies received may not be as efficient as having Division assuming that role.
- This accounts receivable process needs to be further evaluated to determine if Division should play a greater role in collecting cash once the billing is performed by the District. Third party payments could be received at a central location to eliminate the need for Districts to collect and make deposits. Electronic payment from third parties should also be evaluated as a means for speeding up receipt of payments and for managing cash collections more efficiently and effectively.

3.3 Audit Area: Support Operations – Information Resources

3.3 Audit Area: Support Operations – Information Resources	**3.3.1 Risk:** Efficiency of IR Systems

Background:

IR systems are an integral part of all aspects of TxDOT's business. Although there has been some implementation to update the current IR systems and use web-based applications, many of TxDOT's primary computer applications are mainframe or legacy systems. A continuing theme from District personnel is that many of the mainframe and legacy systems are outdated, not user friendly and do not efficiently interact with one another. Some of the current IR systems may expose TxDOT to the risk of inefficient data processing and limit the availability of quality management information.

Observation/Findings:

Legacy system and communication between various system applications.

- Users attempting to extract data for use in reporting, tracking, forecasting and planning find it difficult to combine the information from the various systems in readable and printable formats.
- Due to the multiple systems needed to process and store data, the systems do not process data in "real-time".
- Some of the IR systems have not been updated for more than twenty years, and therefore there is a need to insert additional data fields. Adding new fields to the legacy system in order to increase the level of detail for reporting purposes is cumbersome and must be completed at Division.

In-House program development.

- We learned that during developmental programming performed at Division IR, there is little communication to and input from the Districts. During our interviews, Districts expressed the desire to be more involved in the development of enterprise applications.
- In order to create a more efficient use of data stored in the mainframe systems, Districts have developed in-house programs to extract necessary data and generate relevant reporting and project management tools and documentation.
- Some Districts do not have the personnel with the programming expertise needed to access and effectively utilize the mainframe systems. Therefore, the level of detailed reporting varies across the Districts.
- There are no state wide standards or applications in regards to detailed reporting, tracking, forecasting and planning of cost and schedule information. Some Districts perform informal forecasting and planning while others may not perform these tasks using detailed IR applications and procedures.

Shared technology across Districts.

- Division has the ability to authorize implementation of an "Enterprise" program. Districts would prefer in-house programs developed by a District to be reviewed and refined at the Division level and then rolled out to all Districts. Some Districts feel there is a greater chance of program implementation if Districts personally share programs and applications with other Districts on a more informal basis than with Division facilitating the process.

Training Users on Mainframe Applications

- Many employees within TxDOT have been employed with the organization since the inception of the mainframe system. These employees may be able to navigate through the multiple

3.3 Audit Area: Support Operations – Information Resources	**3.3.1 Risk:** Efficiency of IR Systems

applications of the mainframe system with more ease and accessibility than newer employees who are not familiar with the system. Although some Districts have provided training for new employees, there are no formal training methods across or required by all Districts. Training is often completed by peers with advanced knowledge of the applications on an informal basis.

- Some Districts want to receive more formal training and guidance from IR Division for users of the mainframe applications.

Impact:

Updating or improving the IR systems could substantially improve productivity and efficiency within numerous functions of TxDOT. As the industry continues to grow and change, TxDOT could benefit from adapting its IR applications to meet the needs of the organization, keep pace with the construction industry, and promote efficiency.

Operational Strengths / Leading Practices:

- Many Districts have created individual reporting, tracking, forecasting and planning tools that effectively meet their specific needs. Users have been working with IR programmers to create programs that develop these project management tools and formalized procedures for their use.
- Districts have organized peer groups that bring IR personnel and the end users together to facilitate more efficient development of project management programs.
- Leading organizations typically involve the end user when developing enhancements and new IR applications resulting in more effective and user friendly applications.

Conclusion / Recommendation for Improvements:

There seems to be an overall consensus that the mainframe and legacy systems are outdated and not user friendly. TxDOT should explore the potential for updating its legacy systems. An in-depth analysis should be performed weighing the efficiencies to be gained against the cost of implementation. While an undertaking of this magnitude from a human resource and cost perspective is great, we believe the benefits to be considerable and are worth the investment in the long run. In the short term, other recommendations can be placed into effect immediately. Such recommendations are:

- Establish the most common data needs being requested by the Districts and determine whether any of the Districts has already established a method or program to obtain the data. Continue to use peer groups to bring end users from multiple Districts together with IR personnel to provide input on how the mainframe system could be enhanced. By establishing peer groups that incorporate personnel from multiple Districts, TxDOT will facilitate the development of programs and can focus on programs that have already established by Districts to meet the users need. Peer groups will also allow Districts with more advanced programming skills to work with personnel from Districts who do not have those skills.
- Continue to create in-house programming initiatives at the District level to create more efficient reporting, tracking, forecasting and planning data. Any developments at Districts should be evaluated by Division and distributed statewide if found to add overall benefit.
- Create formal training methods for the end users of the current mainframe applications. Educating users on the system's capabilities may help to ensure the full functionality of the

3.3 Audit Area: Support Operations – Information Resources	**3.3.1 Risk:** Efficiency of IR Systems

mainframe applications are being utilized and help to ensure knowledge of the mainframe systems is not lost.

- The need for advanced programming at the District level should be communicated to Division. If Division evaluates a program and finds substantial benefits of its implementation, the program could be centrally developed and shared statewide. This can create consistency across Districts.
- Additional and periodic training of newly implemented programs and applications would be beneficial to keep employees educated on the newer applications.

3.3 Audit Area: Support Operations – Information Resources	**3.3.2 Risk:** Policy and Procedures for Processing Complaints

Background:

Citizen complaints are a common issue that must be handled throughout all Districts. Currently, there is no formal state-wide process for handling and tracking citizen complaints. Additionally, citizen complaints are received and handled at varying levels within each District, potentially leading to a lack of efficiency and effectiveness in resolving issues.

Observation/Findings:

Citizen's complaints are generally handled by the Maintenance Department. Each District typically assigns a department to be responsible for the complaints and to delegate the responsibility for addressing those concerns to the appropriate Maintenance section at Area Offices.

- We found that there is no formal process or procedures for citizen complaints to reach the Maintenance department. For example, a call that comes in may be fielded by the Area Engineer or the Director of Maintenance and then further distributed to the actual person that will address the concern.
- Complaints are communicated to the Districts by call, email or in-person.
- There is no tracking mechanism in place to measure the frequency, type and severity of calls.
- Some Area Offices use citizen complaints or concerns to measure the overall conditions of the roadways. Also, citizens have proved to be helpful in informing Area Offices of roadway conditions, accidents, lack of signage and other issues with the roadways.

Impact:

Ineffectively processing complaints will create delays in response time and could potentially create additional cost associated with addressing the citizen concerns. Also, by not having a mechanism for measuring frequency or types of calls, solutions to mitigate the causes of reoccurring concerns or complaints may not be fully addressed. This might expose the organization to additional risks.

Operational Strengths / Leading Practices:

- A District has established a formal method of recording and delegating citizen complaint calls. The system utilizes both voicemail and email functions and filters all complaints to one database.

Conclusion / Recommendation for Improvements:

In general, there is a lack of defined process and procedures for tracking and delegating citizen's complaints at the District level. It is important for the Districts to be able to use a citizen complaint center to measure TxDOT's performance with respect to overall roadway conditions.

- Define a clear process and procedure for responding to citizen complaints utilizing a general email system, voicemail or other applicable tool.
- Develop a database system that can track the time received, type, frequency and priority associated with citizen complaints. The database or management system should archive correspondence with the public and be able to filter action items to determine which items have been previously addressed. This could help alleviate reoccurring items and create a permanent

3.3 Audit Area: Support Operations – Information Resources	**3.3.2 Risk:** Policy and Procedures for Processing Complaints

solution if necessary.

- Continue to develop a positive impression and communicate with the public. The public travel the roads everyday and having a good relationship with the citizens can be efficient in solving issues that occur on the roadways.

Section VI: Closing

The information presented in this report summarizes the findings from the TxDOT requested Independent Assessment for Auditable Unit E – Field Operations. With the cooperation of TxDOT employees, we performed multiple interviews in various Districts and Area Offices. From the information gathered and analyzed, we identified risks and opportunities within the organization and provided recommendations for improvement. In addition, we identified operational strengths and exemplary practices currently being utilized by the Divisions and/or Districts.

Appendices

Appendix A – Work Plan Checklist

APPENDIX A

Texas Department of Transportation — **WORK PLAN CHECKLIST** — ✓ = Work Task Completed

	Function	District / Area Office										Project Documentation	Comments
		Atlanta		Austin			Corpus Christi		Dallas				
		District	Texarkana	District	North Austin	Well Branch	District	Alice	District	North East / Rockwall	Southwest Dallas		
1.	**PROJECT DEVELOPMENT**												
1.1	**Planning Function**											✓	Documentation Review List - See Appendix B
1.1.1	**Consistency and Effectiveness of Schedule Planning and Controls**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Identify processes used to develop baseline schedules	✓	✓	✓	✓	✓	✓	✓	✓		✓		There is a lack of consistency in the development of baseline schedules across Districts.
	Develop recommendations for improving project controls	✓	✓	✓		✓	✓	✓	✓		✓		Some Districts have identified the need for detailed schedule controls that span a projects entire life cycle.
	Evaluate consistency and timeliness of performing schedule updates	✓	✓	✓			✓	✓	✓		✓		Schedule updates are not performed on a consistent bases throughout the Districts
	Identify and evaluate the IR systems being used to develop and monitor schedule information	✓		✓			✓		✓				A Primavera software tool is being implemented is some Districts to assist in developing and monitoring project schedules.
1.1.2	**Consistency and Effectiveness of Project Budgeting and Cost Controls**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Develop recommendations for improving project controls	✓	✓	✓		✓	✓		✓				Opportunities exist to improve scheduling and planning coordination between all areas of project development.
	Assess process utilized to develop baseline cost estimates and the controls in place for tracking estimates	✓	✓	✓		✓	✓	✓	✓	✓	✓		A clear and consistent process has not been implemented to identify metrics or benchmarks to determine the overall level of project performance.
	Identify and evaluate the IR systems being used to develop and monitor cost information	✓	✓	✓		✓	✓		✓				Total Project Cost, a system being developed within the DCIS system to create an overall project cost view for monitoring and reporting total project cost.
1.1.3	**Consistency and Accuracy of Construction Cost Estimates**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess process utilized to develop baseline cost estimates and the controls in place for tracking estimates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		There appears to be no formal process for updating estimates for projects with long lead times, i.e. 4-5 years and higher.
1.1.4	**Effectiveness of Sharing of Information between Districts**												
	Conduct interviews	✓		✓			✓		✓				List of Individuals Interviewed - See Appendix C.
	Develop recommendations for improving project controls	✓		✓			✓		✓				Sharing information appears to be geographically localized among the Districts and Areas.
1.2	**Design Function**											✓	Documentation Review List - See Appendix B
1.2.1	**Rationalization and Consolidation of Design Resources at the District Level**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess potential benefits of strengthening the design team at the district offices to improve communication and information sharing	✓	✓	✓		✓	✓		✓				District design teams can focus on design rather than other construction issues. This will lead to an improvement in the overall quality of design work.
1.2.2	**Adequacy of Consultant Design Management**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.

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	Evaluate the processes for reviewing and managing design consultant work including QA/QC work	✓	✓	✓			✓		✓	✓	✓		TxDOT does not perform all the work required and approximately 65% (based on fees) of the project development process including design is performed by outside consultants. There is concern that TxDOT cannot effectively manage the large volume of consultant work including QA/QC checks.
1.2.3	**Effectiveness of Training Programs and Knowledge Transfer**												
	Conduct interviews	✓	✓	✓	✓	✓	✓		✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess training programs and processes for knowledge transfer to identify best practices and potential opportunities to improve sharing of information	✓		✓		✓	✓		✓				Rotation program as a means for training should be a requirement for engineers to enhance skill-sets and comprehensive exposure.
1.2.4	**Employee Recruitment and Retention**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Evaluate key issues impacting recruitment and retention and develop recommendations for improving these areas	✓	✓	✓			✓		✓				Marketing career opportunities more aggressively in the market and stress on exceptional training and benefits provided by TxDOT.
1.3	**Environmental Function**											✓	Documentation Review List - See Appendix B
1.3.1	**Development and Tracking of Schedules During the Environmental Clearance Process**												
	Conduct interviews	✓	✓	✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Identify the processes used to develop environmental baseline schedules and examine them for accuracy and completeness	✓		✓			✓		✓				Timing and strategy for environmental scheduling is unclear, while scheduling software is under utilized.
1.3.2	**Effectiveness of Internal Policies and Procedures**												
	Conduct Interviews	✓	✓	✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Review existing environmental clearance processes, policies, and procedures and assess acceptable risk levels to help make the process more efficient	✓		✓			✓		✓				Implement a cost-benefit approach in determining appropriate risk levels.
	Develop recommendations for improving the environmental process	✓		✓			✓		✓				Improved tracking, scheduling and reporting tools increase the accuracy of project forecasts and provide higher levels of accountability.
1.3.3	**Sharing Environmental Resources, Leading Practices and Experience between Districts**												
	Conduct Interviews	✓		✓			✓		✓				List of Individuals Interviewed - See Appendix C.
	Assess the process utilized to share environmental information and experience throughout the state	✓		✓			✓		✓				Sharing of information between Districts is infrequent. Current sharing opportunities consist of the following: Statewide conferences and meetings, Professional group meetings, Personal relationships, Division recommendations.
1.3.4	**Employee Recruitment and Retention**												
	Conduct Interviews	✓		✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Evaluate key issues impacting recruitment and retention and develop recommendations for improving these areas	✓		✓			✓	✓	✓		✓		Conduct employee surveys to determine areas of improvement. Find unique ways to recognize employees at all levels for outstanding performance. Continue to offer extensive training opportunities.
1.4	**Right of Way (ROW) Function**											✓	Documentation Review List - See Appendix B
1.4.1	**Development and Tracking of ROW Acquisition Costs and Schedules**												
	Conduct interviews	✓		✓		✓	✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.

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		District / Area Office											
	Function	Atlanta		Austin			Corpus Christi		Dallas			Project Documentation	Comments
		District	Texarkana	District	North Austin	Well Branch	District	Alice	District	North East / Rockwall	Southwest Dallas		
	Identify the processes used to develop ROW baseline schedules and examine them for accuracy and completeness	✓		✓			✓		✓				Right-of-Way schedules are set according to the District's letting schedule. Meeting the letting date is the main priority.
	Evaluate the consistency and timeliness of performing schedule updates	✓		✓		✓	✓	✓	✓		✓		There is no consistent tracking system used between the Districts. Updates to the schedule are performed periodically depending on the complexity of the project.
	Assess the process utilized to develop baseline cost estimates and the controls in place for tracking estimates	✓		✓		✓	✓	✓	✓		✓		ROW acquisition estimates are based on numerous factors, including experience, historical cost information, sales comparisons, and tax assessor information. These factors are used to create a baseline estimate for ROW.
1.4.2	**Efficiency of Sharing ROW Resources**												
	Conduct interviews	✓		✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Identify and Evaluate the processes for sharing ROW personnel and information throughout the state	✓		✓			✓		✓				Sharing opportunities between personnel and Districts are generally more limited than for other functions. Information is shared informally and formally but is rarely implemented.
2.	**PROJECT DELIVERY**												
2.1	**Comprehensive Development Agreements**											✓	Documentation Review List - See Appendix B
2.1.1	**Effectiveness of CDA Management and Oversight**												
	Conduct interviews	✓	✓	✓	✓	✓	✓		✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess the adequacy of the processes and procedures utilized for managing CDA contracts	✓		✓		✓	✓		✓				The Division is the lead entity in the CDA process and administers the process during solicitation and procurement.
	Develop recommendations for improving CDA procedures and guidelines	✓		✓		✓	✓		✓				CDA Procedures manual is under development to provide consistency to the approach for delivering projects
	Assess the process utilized to share CDA management procedures and leading practices throughout the state	✓		✓	✓	✓	✓		✓				Division is the lead entity in the CDA process and administers the process during solicitation and procurement, while the Districts provide support and input to develop the project and respond to local issues.
2.2	**Construction Function**											✓	Documentation Review List - See Appendix B
2.2.1	**Accuracy and Effectiveness of Construction Schedule Planning and Controls**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Identify the processes used to develop construction baseline schedules and examine them for accuracy and completeness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Transportation Planning and Development Department (TP&D) determines a general timeframe for the construction schedule when finalizing the plans and quantities. The Design Engineer develops an initial "high-level" schedule and estimates an allowable number of working days
2.2.2	**Effectiveness of Change Order Process**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess the change order process, policies and procedures and identify areas to improve efficiency and remove operational barriers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		The Construction Contract Administration Manual outlines the formal change order process that is initiated when a contractor submits a change order to the Area Engineer. TxDOT should consider using Site Manager's Change Order reporting capabilities for pricing, tracking and analyzing the types of changes.
2.2.3	**Effectiveness of Construction Related IR Systems**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Evaluate the IR systems utilized to support construction activities and assess how this information is collected and communicated throughout the organization	✓	✓	✓	✓		✓	✓	✓	✓	✓		While Site Manager is an effective project management tool which other related IR systems are a risk to the organization.

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2.3	**Maintenance Function**											✓	Documentation Review List - See Appendix B
2.3.1	**Effectiveness of Maintenance Information Resource Systems**												
	Conduct interviews	✓	✓	✓	✓		✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess the IR systems supporting the Maintenance Function and evaluate the processes and procedures utilized to input, retrieve, and communicate maintenance information	✓	✓	✓	✓		✓	✓	✓	✓	✓		Maintenance field personnel commented that the IR systems were adequate but cumbersome and difficult to use.
2.3.2	**Effectiveness of Controls on Maintenance Budget**												
	Conduct interviews	✓	✓	✓	✓		✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Evaluate the budget metrics and change management controls	✓	✓	✓	✓		✓	✓	✓	✓	✓		Maintenance Function is responsible for a significant portion of the TxDOT annual budget and the effectiveness of controls on maintenance budgets represents a significant risk to Districts.
2.3.3	**Utilization of Total Maintenance Contracts**												
	Conduct interviews	✓	✓	✓	✓		✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess the contracting process and the effectiveness of total maintenance contracts currently being utilized	✓	✓	✓	✓		✓		✓	✓	✓		Districts with total maintenance agreements suggested a lack of structure to the contract in past projects.
2.4	**Inspection Function**											✓	Documentation Review List - See Appendix B
2.4.1	**Consistency, Prioritization, Effectiveness of Inspection Scheduling, Planning and Controls**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess the processes utilized to manage inspection resources as well as schedule, and prioritize inspection work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		There is a shortage of inspectors in some Districts largely due to an increase in construction and maintenance projects. Industry practices in the private sector and other state DOTs demonstrate the feasibility of using CEI firms for project inspection.
2.4.2	**Adequacy and District Level Understanding of Inspection Processes on CDA Projects**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Evaluate how inspection processes are implemented on CDA projects and identify areas improving these procedures			✓	✓	✓			✓				The CDA process requires contractors to hire independent inspection firms which are required to complete inspection during construction. Clear roles and responsibilities for TxDOT inspectors should be put in place to assure the quality of construction.
2.4.3	**Adequacy of Technology Resources**												
	Conduct interviews	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		List of Individuals Interviewed - See Appendix C.
	Assess the adequacy of the technology resources available for performing inspection work and identify any constrained resources and/or opportunities to improve efficiency	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		Concerns have been expressed regarding the limited number of computers and cellular phones in the field.

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	Function	Atlanta		Austin			Corpus Christi		Dallas			Project Documentation	Comments
		District	Texarkana	District	North Austin	Well Branch	District	Alice	District	North East / Rockwall	Southwest Dallas		
3.	**SUPPORT OPERATIONS**												
3.1	**Human Resource Function**											✓	Documentation Review List - See Appendix B
3.1.1	**Employee Recruitment and Retention**												
	Conduct interviews	✓	✓	✓	✓		✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess policies and programs currently being utilized to promote recruitment and retention	✓		✓			✓	✓	✓		✓		Several Districts have implemented comprehensive mentoring programs.
	Identify primary areas being impacted by personnel shortages and the key issues driving recruitment and retention challenges	✓	✓	✓	✓		✓	✓	✓		✓		The salary structure is lower at TxDOT than for comparable positions in the private sector. The overall benefits package offered by TxDOT however is helpful in attracting and retaining personnel.
3.1.2	**Appropriateness of Statewide FTE Allocation and Attendant Compensation**												
	Conduct interviews	✓		✓			✓		✓				List of Individuals Interviewed - See Appendix C.
	Assess the FTE allocation process and potential for improving this strategy	✓		✓			✓		✓				FTE allocations to the Districts are set by Division and are typically based on historical headcount requirements. A TxDOT should evaluate the current job market and determine potential solutions for becoming more competitive.
3.1.3	**Effectiveness of Organizational Structure**												
	Conduct interviews	✓	✓	✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess the overall organizational structure and issues associated with the mandated 11:1 ratio	✓	✓	✓			✓	✓	✓		✓		A legislative mandate requires an eleven to one staff to supervisor ratio (11:1), which appears to create inefficiencies within the Districts. The potential for career growth for personnel with technical expertise may be limited
3.1.4	**Efficiency of Knowledge Sharing and Resource Sharing Between Districts**												
	Conduct interviews	✓	✓	✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Evaluate the potential for sharing of resources throughout the state	✓		✓			✓	✓	✓		✓		The existence of societies, learning opportunities, and conferences are prime channels to distribute information. Creating a unified platform to promote the communication between Districts and Division.
3.1.5	**Efficiency and Effectiveness of IR Systems**												
	Conduct interviews	✓	✓	✓			✓		✓				List of Individuals Interviewed - See Appendix C.
	Develop recommendations for addressing the key issues that have been identified	✓		✓			✓		✓				Explore potential for integrating the HR system with other legacy systems.
3.2	**Financial / Accounting Function**											✓	Documentation Review List - See Appendix B
3.2.1	**Project Budgeting and Cost Controls**												
	Conduct interviews	✓		✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess cost controls currently being utilized and identify areas for improvement	✓		✓			✓	✓	✓		✓		Budgets are updated on a yearly basis; however, the level of detail of the update and review of project budgets is inconsistent and varies among the Districts. A clear process has not been developed to identify metrics or benchmarks to determine the overall level of project performance.
3.2.2	**Efficiency of Legacy IR Systems**												
	Conduct interviews	✓		✓			✓		✓				List of Individuals Interviewed - See Appendix C.
	Assess the IR systems supporting the Finance/Accounting Function and evaluate the processes and procedures utilized to input, retrieve, and communicate accounting information	✓		✓			✓		✓				Information pertaining to human resources, payroll, equipment usage, materials and supply, budget, contract, and design and construction all feed into FIMS. The IR accounting systems do not interact with one another and comprehensive reports cannot be created as desired.

APPENDIX A

Texas Department of Transportation — **WORK PLAN CHECKLIST** — ✓ = Work Task Completed

		District / Area Office											
	Function	Atlanta		Austin			Corpus Christi		Dallas			Project Documentation	Comments
		District	Texarkana	District	North Austin	Well Branch	District	Alice	District	North East / Rockwall	Southwest Dallas		
	Evaluate the payroll data collection process and associated IR systems to identify any inefficiencies	✓		✓			✓		✓				Payroll process should be further streamlined to increase efficiency.
3.2.3	**Efficiency and Accuracy of Payroll Collection Data**												
	Conduct interviews	✓	✓	✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Develop recommendations for addressing the key issues related to the Accounting / Finance Function	✓		✓			✓	✓	✓		✓		Explore implementing a system wide ERP system that includes capturing hours and time expended performing certain job tasks (WBS).
	Evaluate the payroll data collection process and associated IR systems to identify any inefficiencies	✓	✓	✓			✓	✓	✓		✓		The process which is used for payroll time reporting is tedious and the results are prone to error. Due to the length of time required to process job cost data and the unreliability of the information, the outputs are either not used or are not accepted by the users.
3.2.4	**Rationalization and Consolidation of Accounting Functions and Resources**												
	Conduct interviews	✓		✓			✓	✓	✓		✓		List of Individuals Interviewed - See Appendix C.
	Develop recommendations for addressing the key issues related to the Accounting / Finance Function	✓		✓			✓		✓				District offices are responsible for processing vendor invoices for supplies and services. There may be an opportunity to reengineer this area to realize greater efficiencies and cost savings.
	Assess structure of the accounting department and evaluate opportunities to consolidate and reallocate accounting professionals	✓		✓			✓		✓				The process by which accounts payable are managed involves is has multiple reoccurring task that can be consolidated.
3.3	**Information Resource Function**											✓	Documentation Review List - See Appendix B
3.3.1	**Efficiency of IR Systems**												
	Conduct interviews	✓		✓			✓		✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess any inefficiencies related to legacy IR systems and their ability to communicate with one another	✓		✓			✓		✓		✓		Users attempting to extract data find it difficult to combine the information from the various systems in readable and printable formats.
	Develop recommendations for improving critical IR systems	✓		✓			✓		✓		✓		TxDOT should explore the potential for updating their systems
3.3.2	**Effectiveness of Policies and Procedures in Processing Complaints**												
	Conduct interviews	✓	✓	✓	✓	✓	✓		✓		✓		List of Individuals Interviewed - See Appendix C.
	Assess the policies and procedures for processing citizen complaints or inquiries and identify any inefficiencies	✓		✓	✓		✓		✓				Currently, there is no formal process for fielding and tracking citizen complaints. Additionally, citizen complaints are received at varying levels within each District potentially leading to a lack of efficiency and effectiveness in resolving issues.

Appendix B – Documentation Review List

Documents	District	Function
Maintenance Plan F/Y 2007	Corpus Christi	Maintenance
Maintenance Plan F/Y 2006	Corpus Christi	Maintenance
District and County Statistics DISCOS	Corpus Christi	Planning
Total Process Time for Environmental Clearance, ROW and PS&E	Corpus Christi	Environmental
In-house Spreadsheet	Corpus Christi	Environmental
Harbor Bridge Chronology	Corpus Christi	Environmental
Blanket Categorical Exclusion Checklist	Corpus Christi	Environmental
Award of Contract	Corpus Christi	Construction
Authorization to Begin Work	Corpus Christi	Construction
Request for Approval of Subcontractor	Corpus Christi	Construction
Preliminary Schedule	Corpus Christi	Construction
Updated Schedule March 2007	Corpus Christi	Construction
Updated Schedule February 2007	Corpus Christi	Construction
Daily Work Report for Contract: 044701050	Corpus Christi	Construction
Daily Work Report for Contract: 044701050	Corpus Christi	Construction
Contractor's Estimate Package	Corpus Christi	Construction
Monthly Construction Estimates	Corpus Christi	Construction
Work Authorization	Corpus Christi	Construction
ETS Project Summary	Corpus Christi	Environmental
Financial Information Management System	Corpus Christi	Construction
Financial Information Management System	Corpus Christi	Construction
Projects Under Construction-Alice & George West Area Offices-Area Engineer	Corpus Christi	Construction
HPTMS Screens	Corpus Christi	IR
HPTMS Presentation	Corpus Christi	IR
HPTMS Report Sample	Corpus Christi	IR
Contact Record (CRP-Calls)	Corpus Christi	IR
Appendix D- Randall Dillard Memo	Corpus Christi	IR
CRP-Calls Complaint Tracking System	Corpus Christi	IR
TxDOT Corpus Christi Information Systems Organization Chart	Corpus Christi	IR
PM Tracker Sample Screens-CRP	Corpus Christi	IR
CRP	Corpus Christi	IR
State Monitoring History	Corpus Christi	Planning
Section 10. Responsibilities	Corpus Christi	Planning
The Urban Transportation Planning Process Contract Procedures Manual	Corpus Christi	Planning
DCIS Entry Screen	Corpus Christi	Planning
In-house Spreadsheets	Corpus Christi	Planning
List of Projects for County	Corpus Christi	Planning
Input sought on highway project-The Victoria Advocate	Corpus Christi	Planning
Updated history of the project	Corpus Christi	Planning
Value Engineering Cost Estimate	Corpus Christi	Planning
US 59 Value Engineering Study	Corpus Christi	Planning
Design Phase Value Engineering-Memorandum	Corpus Christi	Planning

Documents	District	Function
Scope of Service-Memorandum	Corpus Christi	Design
General Notes	Corpus Christi	Construction
Plans Estimate	Corpus Christi	Planning
P.S.&E. Comments-Part 2a-Memorandum	Corpus Christi	Design
Answers to Questions regarding US 59 Project from Goliad North	Corpus Christi	Construction
Information Sheet for Structural Design	Corpus Christi	Design
Project Scoping/DCC/Review Meeting	Corpus Christi	Design
Phase 1 Texas Trunk System Projects-Memorandum	Corpus Christi	Planning
Preliminary Design Conference-Agenda	Corpus Christi	Design
Design Summary Report-Memorandum	Corpus Christi	Planning
Preliminary Design Conference Notes-Memorandum	Corpus Christi	Planning
Surveying Contract No. 16-7XXP1001; Supplement to Work Order No. 19	Corpus Christi	Environmental
Surveying Contract No. 16-7XXP1001; Work Order No. 19	Corpus Christi	Environmental
Traffic Data Request-Memorandum	Corpus Christi	Planning
Traffic Data-Memorandum	Corpus Christi	Planning
Traffic Data-Memorandum	Corpus Christi	Planning
Traffic Data-Interoffice memorandum	Corpus Christi	Planning
Updated history of the project	Corpus Christi	Planning
Review of Goliad Co. Design for US 59 from Fannin to Victoria Co. line-Memorandum	Corpus Christi	Design
Fannin Design Alternatives Meeting Notes-Memorandum	Corpus Christi	Planning
US 59-Memorandum	Corpus Christi	Environmental
Public Hearing Finding of No Significant Impact	Corpus Christi	Environmental
Public Hearing Agenda-For Improvements to US 59	Corpus Christi	Environmental
Pre-construction Meeting-Memorandum	Corpus Christi	Construction
Design Division FSB-Plans, Specifications and Estimate-Memorandum	Corpus Christi	Construction
Project Certifications and revisions to Project Estimate	Corpus Christi	Design
Letting Schedule Modification	Corpus Christi	Planning
7/30/05 Estimate for CSJ	Corpus Christi	Planning
Transportation Improvement Program-STIP Report-June 23, 2005	Corpus Christi	Planning
1/10/2005 Construction Engineering & Contingency Percentages	Corpus Christi	Construction
Design Group Project Status Meeting 11/10/04	Corpus Christi	Design
Project Scoping/DCC/Review Meeting August 25, 2004	Corpus Christi	Design
Preliminary Estimate 5/25/2004	Corpus Christi	Planning
Addendum	Corpus Christi	Planning
Items for the addendum	Corpus Christi	Planning
Change Order	Corpus Christi	Construction
Change Order	Corpus Christi	Construction
Post Letting Contract Proposal-Memorandum	Corpus Christi	Construction
US 59 Goliad Bids	Corpus Christi	Construction
Federal Project Authorization & Agreement	Corpus Christi	Planning
Estimate Change	Corpus Christi	Planning
Monthly Construction Estimates	Corpus Christi	Construction
Work Authorization	Corpus Christi	Planning

Documents	District	Function
ETS Project Summary	Corpus Christi	Environmental
Change Order No. 15-Memorandum	Corpus Christi	Construction
Change Order No. 10-Memorandum	Corpus Christi	Construction
Change Order No. 12-Memorandum	Corpus Christi	Construction
Appropriation Year (AY) 2006 Thru April 2007	Corpus Christi	Maintenance
Sample Purchase Orders	Corpus Christi	Maintenance
RSC Budget FY 2007	Corpus Christi	Maintenance
March 2007 Long Supply by Selection	Corpus Christi	Maintenance
District Categorization	Corpus Christi	Maintenance
Budget Information System	Corpus Christi	Maintenance
Fiscal Year 2005-07, District Preliminary Budget Allocations Strategies 105, 144, 741, 751 & 761 Combined	Corpus Christi	Maintenance
2006 Maintenance Supervisor Classifications	Corpus Christi	Maintenance
SLD Maintenance Section Time Report	Corpus Christi	Maintenance
Daily Activity Report	Corpus Christi	Maintenance
2029 Roadway Material Budget	Corpus Christi	Maintenance
Maintenance Contracts Letting Schedule	Corpus Christi	Maintenance
Maintenance Section and Statewide Maintenance Efficiency and Analysis Report	Corpus Christi	Maintenance
Maintenance Function Codes	Corpus Christi	Maintenance
2007 Maintenance Contracts Summary	Corpus Christi	Maintenance
Pavement Management Information System (PMIS)	Corpus Christi	Maintenance
Maintenance Contract (active)	Corpus Christi	Maintenance
Maintenance Contract (complete)	Corpus Christi	Maintenance
PMIS Plots	Corpus Christi	Maintenance
Right of Way Performance Monitoring Measure	Corpus Christi	ROW
LPA Funding Balance by Entity	Corpus Christi	ROW
Right of Way Status Report-Oct 16, 2006	Corpus Christi	ROW
Compensable Utility Report US 59	Corpus Christi	ROW
Compensable Utility Report FM 70	Corpus Christi	ROW
FY 2005-2007 Right of Way Timeline	Corpus Christi	ROW
Project Funding & Expenditure Summary as of March 19,2007	Corpus Christi	ROW
Chapter 1 Administrative Requirements Preliminary to Formal Release for Right of Way Acquisition	Corpus Christi	ROW
Chapter 15 Title Requirements and Procedure for Title Examination, Escrow, and Closing	Corpus Christi	ROW
Pre-2007 Lettings	Corpus Christi	ROW
Strategy 102 Allocations	Corpus Christi	ROW
Budget Information System (BIS) (R22)	Corpus Christi	ROW
Revisions for Annual District Forecast of Strategy 102 Expenditures	Corpus Christi	ROW
District Strategy 102 Forecast	Corpus Christi	ROW
FY 2005-2007 Letting Schedule	Corpus Christi	ROW
FY 2006-2008 Letting Schedule	Corpus Christi	ROW
FY 2007-2009 Letting Schedule	Corpus Christi	ROW
FTE Allocations	Corpus Christi	ROW
Parcel Summary	Corpus Christi	ROW
District-wide FTE Report	Corpus Christi	HR

Documents	District	Function
Turnover Analysis by Job Category	Corpus Christi	HR
ETS Project Summary	Corpus Christi	Environmental
FY06 thru FY08 Audits	Corpus Christi	Audit
FY2007 Risk Assessment & Audit Plan	Corpus Christi	Audit
Vehicle Utilization-Audit Report	Corpus Christi	Audit
Construction Contract Administration Audit (1201-5) Corpus Christi Report	Corpus Christi	Audit
Alice Maintenance Office-Audit Report	Corpus Christi	Audit
Alice Area Office-Audit Report	Corpus Christi	Audit
Corpus Christi Maintenance Office-Audit Report	Corpus Christi	Audit
Tex-An Phone Review-Audit Report	Corpus Christi	Audit
VTR Inventory Audit Report	Corpus Christi	Audit
Consultant Engineering Contract Compliance Function (1103-1) Corpus Christi District Report	Corpus Christi	Audit
Vehicle Utilization-Audit Report	Corpus Christi	Audit
Alternative Fuel Use-Audit Report	Corpus Christi	Audit
Human Resources Compliance Follow-up Audit Report	Corpus Christi	Audit
Corpus Christi District Submittal Checklist	Corpus Christi	Design
FY 07 Actual Modified Letting List as at 4/18/07	Corpus Christi	Design
Corpus Christi District FY 2007 Letting Performance Based on Remaining Scheduled Projects	Corpus Christi	Design
The Consulting Engineers Council of Texas Perspective on the 1999 TxDOT/PricewaterhouseCoopers Cost Study (.doc)	Corpus Christi	Consultant Contract
Example Work Authorization for S&B (.pdf)	Corpus Christi	Consultant Contract
Compensable Utility Report FM 70(.xls)	Corpus Christi	ROW
Fourth Quarter, FY 2006 Right of Way Performance Monitoring Measures (.pdf)	Corpus Christi	ROW
Fourth Quarter, FY 2005 Right of Way Performance Monitoring Measures (.pdf)	Corpus Christi	ROW
Fourth Quarter, FY 2004 Right of Way Performance Monitoring Measures (.pdf)	Corpus Christi	ROW
Fourth Quarter, FY 2003 Right of Way Performance Monitoring Measures (.pdf)	Corpus Christi	ROW
Notification of Addendum-Addendum No. 2-Dated 8/04/2006 (.pdf)	Corpus Christi	Construction
Job Requisition Log-2005 (.doc)	Corpus Christi	HR
Job Requisition Log-2006 (.doc)	Corpus Christi	HR
Job Requisition Log-2007 (.doc)	Corpus Christi	HR
Training 2006_xp (.mdb)	Corpus Christi	HR
Employee Recognition Program	Corpus Christi	HR
CRP District Termination Stats (.pdf)	Corpus Christi	HR
FTE-Recap 2007 (.xls)	Corpus Christi	HR
CRP District 2006 Health/Benefit Fairs (.ppt)	Corpus Christi	HR
FY'06 Average Maintenance Hourly Salary (.xls)	Corpus Christi	HR
Workforce Analysis by Occupational Category, FY 06 (.xls)	Corpus Christi	HR
Rapid Hire Activity (.xls)	Corpus Christi	HR
EEO/AAP Quarterly Activity Report (.doc)	Corpus Christi	HR
ATT761589.txt	Corpus Christi	HR

Documents	District	Function
EEO/AAP Quarterly Activity Report (.pdf)	Corpus Christi	HR
Form (.pdf)	Corpus Christi	HR
Training 2006_xp (.mdb)	Corpus Christi	HR
Employee Recognition Program-CRP	Corpus Christi	HR
EEO Job Category Analysis (.pdf)	Corpus Christi	HR
Spring 2006 Recruitment Schedule (.pdf)	Corpus Christi	HR
EEO Job Category Analysis (.pdf)	Corpus Christi	HR
Corpus Christi District Submittal Checklist (.doc)	Corpus Christi	Design
AvgSal_ServTime_TransEng_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_Const_Insp_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_Eng_Asst)JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_Maint_Techs_JAN07 (.xls)	Corpus Christi	HR
Starting Salaries Eng Asst Historical Avg_1 (.xls)	Corpus Christi	HR
AvgSal_ServTime_AsstMaintSectSup_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_CrewChief_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_MaintInsp_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime4_MaintSectAsst_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_MaintSectSup_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_TrafficSystTechs_JAN07 (.xls)	Corpus Christi	HR
AvgSal_ServTime_TransEngSuprv_JAN07 (.xls)	Corpus Christi	HR
Hiddenpay1 (.xls)	Corpus Christi	HR
2007 Salary Results (.pdf)	Corpus Christi	HR
Management to Staff Ratios (.pdf)	Corpus Christi	HR
Turnover Analysis by Job Category-Qtr. 2-2007 (.pdf)	Corpus Christi	HR
Full Time Equivalent (FTE) Report FY2007 (.pdf)	Corpus Christi	HR
FTE-Headcount (.xls)	Corpus Christi	HR
Business Titles Used in CRP (.pdf)	Corpus Christi	HR
Employee Titles with Pay Rate, Grouped by Business Title (.pdf)	Corpus Christi	HR
DDO/Strategy Summary by Budget Object (R15)-Thru March 2007 (.pdf)	Corpus Christi	Accounting
DDO/Strategy Summary by Budget Object (R22)-Thru March 2007 (.pdf)	Corpus Christi	Accounting
FY2007-Indirect Costs	Corpus Christi	Accounting
Preliminary Engineering Efficiency Report-Part 2-April 2004 thru March 2007 (.pdf)	Corpus Christi	Accounting
Manager Summary Project Ledger for the Month of March 2007 (.pdf)	Corpus Christi	Accounting
Project Ledger as of April 19, 2007 (.pdf)	Corpus Christi	Accounting
Manager Summary Project Ledger for the Month of March 2007 (.pdf)	Corpus Christi	Accounting
Project Ledger as of April 19, 2007 (.pdf)	Corpus Christi	Accounting
Manager Summary Project Ledger for the Month of March 2007 (.pdf)	Corpus Christi	Accounting
Project Ledger as of April 19, 2007 (.pdf)	Corpus Christi	Accounting
Automated Budget Request Form (ABR) (20071602.xls)	Corpus Christi	Accounting
$RqstforDDO_Harbor Bridge FY07_1 (.xls)	Corpus Christi	Accounting
Code Chart 58 (.pdf)	Corpus Christi	Accounting
Code Chart 10 (.pdf)	Corpus Christi	Accounting
FY06 Indirect Costs (FEDID2006-A.xls)	Corpus Christi	Accounting

Documents	District	Function
Code Chart 12-Segment 76 (.pdf)	Corpus Christi	Accounting
Contract Selection and Award Process Flowchart (.doc)	Corpus Christi	Consultant Contract
Suppl Agreement Process Flowchart (.doc)	Corpus Christi	Consultant Contract
Contract Selection and Award Process Flowchart (.doc)	Corpus Christi	Consultant Contract
Suppl Agreement Process Flowchart (.doc)	Corpus Christi	Consultant Contract
Consultant E&O (.pdf)	Corpus Christi	Design
Consultant E&O Procedures (.pdf)	Corpus Christi	Design
Consultant Errors & Omissions Correction and Collection Procedures (.pdf)	Corpus Christi	Consultant Contract
Jose Gaytan (.vcf)	Corpus Christi	Consultant Contract
Consultant Status Report (Report8color.xls)	Corpus Christi	Consultant Contract
07-04-Chart2007 (.xls)	Corpus Christi	Design
07-04-Chart2007 (.pdf)	Corpus Christi	Design
Revised Submittal Checklist (.doc)	Corpus Christi	Design
APD	Dallas	Environmental
Schematic Tracking	Dallas	Environmental
CPYSI Evergreen WA2	Dallas	Environmental
CPYSI Evergreen WA2	Dallas	Environmental
District Project Sheet	Dallas	Environmental
Standard Operating Procedure No. 100-06	Dallas	Environmental
Standard Operating Procedure No. 101-06	Dallas	Environmental
Standard Operating Procedure No. 102-06	Dallas	Environmental
Standard Operating Procedure No. 99-06	Dallas	Environmental
APD-12 Month Letting List	Dallas	Environmental
APD Billings	Dallas	Environmental
APD Billings	Dallas	Environmental
Use of ETS timeline for Project Planning-Memorandum	Dallas	Environmental
P.S.&E. Review and Processing Schedule for FY 2007	Dallas	Environmental
APD-12 Month Letting List	Dallas	Environmental
Schematics	Dallas	Environmental
Schematics	Dallas	Environmental
Project Summary for Dallas District by CSJ	Dallas	Environmental
Project Summary for Dallas District by CSJ	Dallas	Environmental
Project Development Process	Dallas	Environmental
Environmental Documentation Process	Dallas	Environmental
Evergreen Contract with Work Authorizations	Dallas	Consultant Contract
Evergreen Consultant Contract Template	Dallas	Consultant Contract
Project Specific Consultant Contract Template	Dallas	Consultant Contract
CPM Services Contract with Work Authorizations	Dallas	Consultant Contract
Professional Services Contracts Evaluation Forms	Dallas	Consultant Contract
Selection Process	Dallas	Consultant Contract
Long List Evaluation Summary	Dallas	Consultant Contract
Dallas District Construction Projects March 2007	Dallas	Construction
District Project Sheet	Dallas	Construction
Eminent Domain Petition Report Dallas District Right Of Way	Dallas	ROW
Parcel Acquisition Report Dallas District Right Of Way	Dallas	ROW
Right Of Way Acquisition Status	Dallas	ROW
Money Spent by Date Range	Dallas	ROW

Documents	District	Function
Money By Highway and Selected Right Of Way Control-Section-Job Number	Dallas	ROW
ROW Acquisition Schedule	Dallas	ROW
Contractor's Detail Report	Dallas	Construction
Right Of Way Acquisition Status	Dallas	ROW
Maintenance Contracts (lump sum & negotiated)	Dallas	Maintenance
Pavement Section Performance Monitoring Tool	Dallas	Maintenance
TxDOT System Interface Diagrams	Dallas	IR
CDA Programmatic Term Sheet (Revised) including Comprehensive Development Agreement (CDA)	Dallas	CDA
Budget Information System (BIS) (R14)	Dallas	Accounting
Dallas District Accounting and Administrative Services	Dallas	Accounting
Project Summary for Dallas District by CSJ	Dallas	Planning
2006 Programmed Letting Volume	Dallas	Planning
Coord. Requirements	Dallas	Environmental
Final Verification of 2980-01-008 and 2980-02-006	Dallas	Environmental
2980-01-008 FM 2934	Dallas	Environmental
Consultation for FHWA/TxDOT Dallas District Project	Dallas	Environmental
Environmental Assessment (EA) Review-Memorandum	Dallas	Environmental
Design Schematic Review-Memorandum	Dallas	Environmental
Design Schematic-Memorandum	Dallas	Environmental
FM 2934 Schematic	Dallas	Environmental
2nd Environmental Assessment Review-Memorandum	Dallas	Environmental
Schematic Review-Memorandum	Dallas	Environmental
Design Schematic-Memorandum	Dallas	Environmental
Schematic Review-Memorandum	Dallas	Environmental
Letter of Transmittal	Dallas	Environmental
Design Schematic-Memorandum	Dallas	Environmental
Environmental Assessment (EA) Review-Memorandum	Dallas	Environmental
Lewisville Lake Toll Bridge	Dallas	Environmental
Schematic Review-Memorandum	Dallas	Environmental
Design Schematic-Memorandum	Dallas	Environmental
Project Specific 2980	Dallas	Environmental
Strategy Summary by Budget Account (R13)	Dallas	Accounting
Summary by Strategy (R14)	Dallas	Accounting
Strategy Summary by Budget Object (R15)	Dallas	Accounting
Budget Account Summary by Budget Object/Expenditure Object (R26)	Dallas	Accounting
Budget Account Detail by Budget Object/Expenditure Object/Voucher (R25)	Dallas	Accounting
Budget Account Summary by Budget Object (R22)	Dallas	Accounting
Budget Object Detail by Expenditure Object/Voucher (R23)	Dallas	Accounting
Speaking Notes & Transition to Follow-on Slides	Dallas	HR
Project Plan Instructions	Dallas	IR
OPR Roles & Responsibilities for Information Technology Assets	Dallas	IR
Organization Chart and Job Descriptions/Duties/Minimum Requirements	Dallas	IR
Dallas District Programming Follow-up	Dallas	Maintenance

Documents	District	Function
IH 35E Reconstruction/Project 2	Dallas	Design
DCIS Input Form Version 5 (.xlt)	Dallas	Planning
ASED with Spreadsheet (.xlt)	Dallas	Planning
ASED-Document (.dot)	Dallas	Planning
Programmatic_Term_Sheet (.pdf)	Dallas	CDA
Technical Provisions: Draft Book 2B "General Conditions" for TxDOT's CDA Program	Dallas	CDA
Comprehensive Development Agreement Requests for Qualifications/Proposals	Dallas	CDA
Comprehensive Development Agreements	Dallas	CDA
Mobility 2030 Development	Dallas	CDA
Regional Transportation Council (RTC)	Dallas	CDA
Public-Private Partnerships: Opportunities for Infrastructure Privatization (.ppt)	Dallas	CDA
Memorandum CDA Diary on Issues April2007 (.doc)	Dallas	CDA
SH 121 Comprehensive Development Agreement Summary (.doc)	Dallas	CDA
Talking Points for CDA Issues June 2006 (.doc)	Dallas	CDA
Resources for Comprehensive Development Agreement Oversight (.doc)	Dallas	CDA
2006 Toll Roads Sessions Bob Brown (.ppt)	Dallas	CDA
Monthly Evergreen Report	Dallas	CDA
Wizards Screen Shots (.ppt)	Dallas	Planning
Construction Contract Administration Audit (1201-5) Department-wide Report/Leading Practices	Dallas	Construction
ROWAPS Contract Audit	Dallas	ROW
Dallas District Facilities Maintenance Audit PA 07-105	Dallas	Maintenance
Right of Way Status Report	Atlanta	ROW
Eminent Domain Schedule	Atlanta	ROW
Utility Status Report	Atlanta	ROW
Relocation Check Logs	Atlanta	ROW
Right of Way Map Status Report	Atlanta	ROW
SH 154 - Outsource Tracking Report	Atlanta	ROW
SH 154 - Parcel Acquisition Status Report	Atlanta	ROW
FM 559 - Status Report	Atlanta	ROW
FM 559 - ROW Project Status Report	Atlanta	ROW
FM 559 - Project Summary	Atlanta	ROW
Memorandum - Categorical Exclusion	Atlanta	Environmental
Memorandum - Requesting Bridge Division Complete Structural Details	Atlanta	Environmental
Memorandum - Programmatic Categorical Exclusion	Atlanta	Environmental
Interim Report for Archeological Survey	Atlanta	Environmental
Memorandum - Data Reviewed for Detailed Plan Preparation	Atlanta	Environmental
Historic Preservation	Atlanta	Environmental
Memorandum - Data Reviewed for Detailed Plan Preparation	Atlanta	Environmental
ENV Status Report	Atlanta	Environmental
Memorandum - District Construction Letting	Atlanta	Design
Memorandum - 2007 Quarterly Letting Report and	Atlanta	Design

Documents	District	Function
Summary		
P.S.E. Submittal Log FY2007	Atlanta	Design
Atlanta District Design Letting FY2007	Atlanta	Design
Condition Survey	Atlanta	Maintenance
Duties	Atlanta	HR
Memorandum - Fiscal Year 2007 Letting Schedule	Atlanta	Planning
Bridge Details Status Report	Atlanta	Planning
Current Consultant Contracts for Engineering Services	Atlanta	Planning
Preliminary Bridge Hydraulics Status Report	Atlanta	Planning
Atlanta District FY07 Letting ($ in Millions)	Atlanta	Planning
Atlanta District Asbestos Inspections	Atlanta	Planning
Memorandum - Consent to Award Provider Contract Original RFP Number 19-4RFP5001	Atlanta	Consultant Contract
Memorandum - Consent to Award Provider Contract Contract Number 19-448P5003	Atlanta	Consultant Contract
Memorandum - Contract No. 19-0RFP5003 Miscellaneous Projects in Atlanta District	Atlanta	Consultant Contract
Memorandum - Proposed Contract No. 19-045P5002 Contract Awarded to Parson Brinckerhoff, Quade & Douglas, Inc.	Atlanta	Consultant Contract
Carter-Burgess Contract 19-448P5003	Atlanta	Consultant Contract
Exhibit C - Work Schedule	Atlanta	Consultant Contract
WA #5 - US 259 Widening Monthly Project Progress Report	Atlanta	Consultant Contract
Consultant Engineering Contract Compliance (1103-1) Atlanta District Report	Atlanta	Consultant Contract
Consultant Engineering Contract Administration Function (1103-1) Department-wide Report	Atlanta	Consultant Contract
Memorandum - Interim Audit	Atlanta	Construction
Memorandum - Final Estimate	Atlanta	Construction
Final Project Records Review Report	Atlanta	Construction
Approve Subcontracts	Atlanta	Construction
Latest Est of Cost 4788972	Atlanta	Construction
Changes to Contract	Atlanta	Construction
Memorandum - Final Payment of Contract	Atlanta	Construction
FHWA-1446C (Participating)	Atlanta	Construction
Contractor's Estimate Package	Atlanta	Construction
SiteManager Final Estimate Progress Report	Atlanta	Construction
Final Revised Estimate of Quantities	Atlanta	Construction
SM Final Estimate	Atlanta	Construction
Final Project Review Summary	Atlanta	Construction
Letter	Atlanta	Construction
Agreement	Atlanta	Construction
US 259 Sequence of Work	Atlanta	Construction
Memorandum - Change Order No. 6	Atlanta	Construction
Memorandum - Change Order No. 4	Atlanta	Construction
Memorandum - Change Order No. 3	Atlanta	Construction
Memorandum - Change Order No. 2	Atlanta	Construction
Memorandum - Change Order No. 1	Atlanta	Construction
Letter	Atlanta	Construction

Documents	District	Function
Authorization to Begin Work	Atlanta	Construction
Request for Approval of Subcontractor	Atlanta	Construction
Pre-Construction Conference Report	Atlanta	Construction
Contract Inquiry (C2)	Atlanta	Division Overlap
Bids Received Report	Atlanta	Division Overlap
Environmental Clearance	Atlanta	Division Overlap
Memorandum - Final P.S.&E. Review and Revision Notification	Atlanta	Division Overlap
Interoffice Memorandum - PS&E Review	Atlanta	Division Overlap
STP 2007 (390)	Atlanta	Division Overlap
STP 2007-(390)	Atlanta	Division Overlap
STP 2007-(390)	Atlanta	Division Overlap
STP 2007-(390)	Atlanta	Division Overlap
Memorandum - Traffic Safety Review Committee Meeting	Atlanta	Division Overlap
Memorandum - Final PS&E Paperwork	Atlanta	Division Overlap
Memorandum - Completed Review of PS&E	Atlanta	Division Overlap
Memorandum - PS&E Documentation Received	Atlanta	Division Overlap
Memorandum - Final P.S.&E. Items	Atlanta	Division Overlap
Memorandum - Final Schematic (Moore's Lane)	Atlanta	Division Overlap
Preliminary Estimate	Atlanta	Division Overlap
Letter	Atlanta	Division Overlap
Memorandum - Programmatic Categorical Exclusion	Atlanta	Environmental
Memorandum - Internal Review under the Programmatic Agreement	Atlanta	Environmental
Memorandum - Internal Review under the Programmatic Agreement	Atlanta	Environmental
Letter	Atlanta	Environmental
Comments on Revised Document FM 2148	Atlanta	Environmental
Memorandum - Internal Review under the Programmatic Agreement	Atlanta	Environmental
Memorandum - Install LTL	Atlanta	Environmental
Environmental Document	Atlanta	Environmental
Accounting (.ppt)	Austin	Accounting
Accounting Staff Duties (.xls)	Austin	Accounting
BIS for Managers (.ppt)	Austin	Accounting
Budget Process (.ppt)	Austin	Accounting
Prime Provider Evaluation Procedures (.doc)	Austin	Consultant Contract
Courtesy Reminder of Term (.doc)	Austin	Consultant Contract
10 Steps to Evaluate the Prime Provider (.doc)	Austin	Consultant Contract
CST Team Instructions (.doc)	Austin	Consultant Contract
Consultant Selection Check List (.xls)	Austin	Consultant Contract
Approval Memo Checklist (.xls)	Austin	Consultant Contract
Work Authorization Procedures (.doc)	Austin	Consultant Contract
What a Lump Sum Requires on WA & SWA (.doc)	Austin	Consultant Contract
Sample LOI Schedules (.xls)	Austin	Consultant Contract
Contract Selection and Award Process Flowchart (.doc)	Austin	Consultant Contract
Supplemental Agreement Process Flowchart (.doc)	Austin	Consultant Contract
naaoinspector (.xls)	Austin	Inspection
Change Order Reason Codes (.doc)	Austin	Construction

Documents	District	Function
Project Ledger CSJ 0151-05-072 (.pdf)	Austin	Construction
Special Provision-008-010 (.pdf)	Austin	Construction
I2MS Information	Austin	CDA/Inspection
CIA Data/Form 1258/Form1257/Maintenance Contract	Austin	Maintenance
CDA Programmatic Term Sheet	Austin	CDA's
Summary of UTP funding categories	Austin	Maintenance
Testimony	Austin	Maintenance
Contract Administrator Screen-Shot	Austin	Professional Contracts
Approval Documentation	Austin	Professional Contracts
CDA Leading Practices	Austin	CDA's
Project Status Report	Austin	Planning
Texas Department of Transportation (TxDOT) Organization Chart	TxDOT	General
TxDOT Mission and Vision	TxDOT	General
TxDOT – District Organization Charts	TxDOT	General
TxDOT – District Engineer Biographies	TxDOT	General
TxDOT – Zone/County/District Maps	TxDOT	General
TxDOT – Summary of current projects for each District visited	TxDOT	General
Texas Transportation Commission – Forward Momentum, A Report to the 110th Congress, 1st Session	TxDOT	General
TxDOT – Meeting the Texas Transportation Challenge, 80th Texas Legislative Session	TxDOT	General
TxDOT has a Plan, Strategic Plan for 2007 – 2011	TxDOT	Planning
TxDOT – DCIS User Manual	TxDOT	Construction
TxDOT – Project Development Policy Manual	TxDOT	Project Development
TxDOT – Project Development Process Manual	TxDOT	Project Development
TxDOT – Construction Contract Administration Manual	TxDOT	Construction
TxDOT – Access Management Manual	TxDOT	General
TxDOT – Maintenance Management Manual	TxDOT	Maintenance
TxDOT – Material Inspection Manual	TxDOT	Construction
TxDOT – PS&E Preparation Manual	TxDOT	Design
2006 Annual Summary	TxDOT	Planning
District Intranet Websites	TxDOT	General
Texas Department of Transportation Construction Contract History (FY 2004 through FY 2006)	TxDOT	Construction
TxDOT Construction Division Change Order History by District (FY 2003 through FY 2006)	TxDOT	Construction
TxDOT Construction Division Change Order History Summary (FY 2003 through FY 2006)	TxDOT	Construction
TxDOT Finance Division – Code Charts and Process Maps for Various Operations	TxDOT	Accounting
TxDOT Preliminary Engineering Costs on Construction Projects (2003, 2004, & 2005)	TxDOT	Construction
Texas Department of Transportation – Annual Report on Measures (FY 2003 through FY 2006)	TxDOT	General
TxDOT Internal Memorandum – AY 2007, AY 2008, and AY 2009 Approved Budget Allocations	TxDOT	General
TxDOT Full Time Equivalent (FTE) Report – First Quarter FY 2007	TxDOT	HR

Documents	District	Function
TxDOT Design Division Consultant Contracts Allocation Report (Budget Request / Expenditure / Percent Utilized) (FY 2004 through FY 2006)	TxDOT	Design
Texas Maintenance Assessment Program (TxMAP)- FY 2006	TxDOT	Maintenance
TxDOT Routine Maintenance – 2006 Annual Report	TxDOT	Maintenance
Texas Statewide – Detailed Maintenance Efficiency and Analysis Report –FY 2006	TxDOT	Maintenance
TxDOT FY 2006 Maintenance Budget Allocation	TxDOT	Maintenance
TxDOT Design Division Professional Services Contract Selection and Award Process	TxDOT	Design
TxDOT Design Division Professional Services Contract Supplemental Agreement Process	TxDOT	Design
Utilization of Consulting Engineers for Highway Project Development	TxDOT	Project Development
Utilization of Consultants by SDHPT Research Report 1100-1F, Texas Transportation Institute The Texas A&M University System College Station, Texas	TxDOT	Project Development
Utilization of Consultants by the State Department of Highways and Public Transportation by W.V. Ward, Clyde E. Lee, and Christopher M. Bradley, Research Report 1101-1F	TxDOT	Project Development
Transportation Planning and Programming – 2007 Statewide Mobility Program	TxDOT	Planning
Texas Department of Transportation – Highway Design Cost Comparison (February 1999) by Price Waterhouse Coopers	TxDOT	Design
Consulting Engineers Council of Texas – A Review of TxDOT Cost Allocation Methodologies by MGT of America	TxDOT	Accounting
TxDOT Design Division Professional Services Contract Selection and Award Process	TxDOT	Consultant Contract
TxDOT Design Division Professional Services Contract Supplemental Agreement Process	TxDOT	Design
District Design Oversight (202-3) Department Wide Report	TxDOT	Audit
District Design Oversight Follow-up (202-3F) Department Wide Report	TxDOT	Audit
Consultant Engineering Contract Administration Function (1103-1) Department Wide Report	TxDOT	Audit
Information Resources Planning, Implementation & Support Function (403-6) Department-wide Report	TxDOT	Audit
Environmental Process (1105-1) Department-wide Report	TxDOT	Audit
Materials and Pavement Function (1201-3) Department-wide Report	TxDOT	Audit
ROWAPS Contracts Audit (1104-1) Statewide Report	TxDOT	Audit
Oversight of Survey Contracts Function (1201-2) Department-wide Report	TxDOT	Audit
TTA Contracting and Financial Compliance Follow-up (103-8F) Department – wide Report	TxDOT	Audit

Documents	District	Function
CMAQ Program Audit (1101-1) Statewide Report	TxDOT	Audit
CMAQ Program Follow-up (1101-1F) Department-wide Report	TxDOT	Audit
TP&P Project Authorization Process (102-4) Department-wide Report	TxDOT	Audit
Maintenance Funding Accountability Follow-up (301-6F) Department-wide Report	TxDOT	Audit
Maintenance Contracts (301-7) Department-wide Report	TxDOT	Audit
Right of Way Acquisition (203-5) Department-wide Report	TxDOT	Audit
Human Resources Function (1503-1) Department-wide Report	TxDOT	Audit
Contract Payments Audit (1502-1) Department Wide Report	TxDOT	Audit
Performance Measures Audit (1501-1) Department Wide Report	TxDOT	Audit
Oversight of Survey Contracts Function (1201-2) Department Wide Report	TxDOT	Audit
Oversight of Survey Contracts Function Follow-up (1201-2F) Department Wide Report	TxDOT	Audit

Appendix C – Individuals Interviewed

Individual	Title	Districts	Phase
Richard Williamson	Texas Transportation Commission	Central	1
Ted Houghton	Texas Transportation Commission	Central	1
Jeremiah Kuntz	Executive Director for Commissioner Houghton	Central	1
Michael W. Behrens	Executive Director - Administration	Central	1
Owen Whitworth	Director - Audit Office	Central	1
Craig E. Clark	District Engineer	Corpus Christi	3
Anthony Parlamas	Information Systems	Corpus Christi	3
Ella R. Mason	Human Resources Officer	Corpus Christi	3
Howard Gillespie	Port Aransas Ferry System	Corpus Christi	3
Ismael C. Soto	Director of Transportation Operations	Corpus Christi	3
Joe Pena	Planning	Corpus Christi	3
John Sanchez	Purchasing and Warehousing	Corpus Christi	3
Jose Gaytan Jr.	Director of Construction	Corpus Christi	3
Larry Timmerman	Contract Management/Design	Corpus Christi	3
Linda Guartuche	Office Manager	Corpus Christi	3
Martin Wenger	Contract Management/Design	Corpus Christi	3
Paula Sales-Evans	Director of TP&D	Corpus Christi	3
Pete Stricker	District Design	Corpus Christi	3
Rene Liberto	Director of Administration	Corpus Christi	3
Ron Stuckey	Right Of Way Administrator	Corpus Christi	3
Roy Jarbeaux	Internal Review Analyst	Corpus Christi	3
Sonja Lopez Sosa	Legislative Liaison	Corpus Christi	3
Stephen Ndima	Planning	Corpus Christi	3
Steven Ashley	Environmental Quality Specialist	Corpus Christi	3
Tomas Trevino	Geometric Design	Corpus Christi	3
Victor E. Vourcos	Advance Project Development Engineer	Corpus Christi	3
Victor Pinon	Director of Maintenance	Corpus Christi	3
Chris Caron	Alice Area Engineer	Corpus Christi	3
Noel Ibarra	Alice Area Maintenance Supervisor	Corpus Christi	3
William L. Hale	District Engineer	Dallas	1, 3
Brian Barth	Director of TP&D	Dallas	1, 3
Dan Perge	Lead Engineer, Environmental	Dallas	3
David J. Jessup	Roadway Design	Dallas	3
Gary D. Charlton	Director of Maintenance	Dallas	3
H. Stan Hall	Advanced Project Development	Dallas	3
John P. Marshall	Accounting	Dallas	3
Keith Laird	Human Resources	Dallas	3
Moosa Saghian	Director of Contract Administration	Dallas	3
Nabeel Khwaja	Planning	Dallas	3
Rhonda Poole	Professional Services and Contracts	Dallas	3
Robert M. Brown	Deputy District Engineer	Dallas	3
Scott Dorsett	Information Resources	Dallas	3

Individual	Title	Districts	Phase
Suzy Oviedo	Internal Auditor	Dallas	3
Terry Bruce	Construction Administrator	Dallas	3
Tim Powers	Director of Administration	Dallas	1, 3
Tracey Friggle	Director of Construction	Dallas	1, 3
Travis Henderson	Right Of Way	Dallas	3
Wes McClure	Special Services Engineer	Dallas	3
Paul E. Williams	N.E. Dallas Area Engineer	Dallas	3
Russell Walker	N.E. Dallas Maintenance Supervisor	Dallas	3
Gary Moonshower	S.E. Dallas Area Engineer	Dallas	3
Robert H. Ratcliff	District Engineer	Atlanta	3
Carl Preston	Information Resources	Atlanta	3
Charles Russell	Director of Maintenance	Atlanta	3
Dan Weathersby	Right Of Way	Atlanta	3
David Neshyba	Design	Atlanta	3
Deanne Simmons	Advanced/Urban Transportation Planning	Atlanta	3
Dennis Beckham	Director of TP&D	Atlanta	3
Glenda Haugh	Accounting/Human Resources	Atlanta	3
James Joslin	Director of Construction	Atlanta	3
Lance Simmons	Special Projects/Bridge Engineer	Atlanta	3
Rickie Shields	Construction Contract Management	Atlanta	3
Kenny Icenhower	Texarkana Area Engineer	Atlanta	3
Scott Smith	Texarkana Area Maintenance Supervisor	Atlanta	3
Robert B. Daigh	District Engineer	Austin	1, 3
Becky Smith	Contract Specialist IV	Austin	3
Carol Jagtiani	Internal Auditor	Austin	1, 3
Danny Stabeno	District Construction Administrator	Austin	3
Ed Collins	Planning, Programming and Transit	Austin	3
James Bartsch	Accounting	Austin	3
James D. Klotz	Director of Construction	Austin	3
Joseph G. Carrizales	Advanced Project Development Engineer	Austin	3
Kevin Setoda	Information Resource Administrator, Automation	Austin	3
Lowell D. Choate	Director of Maintenance	Austin	1, 3
Mike Walker	Environmental Coordinator	Austin	3
Patricia Crews-Weight	District Design	Austin	3
Robert L. Stuard	Deputy District Engineer	Austin	3
Sharon Little	Director of Administration	Austin	3
Terron Evertson	Right Of Way	Austin	3
Thien Tri Nguyen	Professional Services Contract Engineer	Austin	3
Terry G. McCoy	North Austin Area Engineer	Austin	3
Wesley Burford	Director of TP&D	Austin	1, 3
Enoch Needham	Supvr. Eng of PPP (Wells Branch)	Austin	3
Jeff Curren	Program Manager (Wells Branch)	Austin	3
Timothy J. Weight	Director of Turnpike Const. (Wells Branch)	Austin	3
Michael W. Behrens	Executive Director	Administration	

Individual	Title	Districts	Phase
Owen Whitworth	Director	Audit Office	
Mark Tomlinson	District Engineer	Amarillo	1
Gary Trietsch	District Engineer	Houston	1
Charles Gaskin	Director of Construction	Houston	1
Cindy Gloyna	Information Systems	Houston	1
David Williams	Accounting	Houston	1
Delvin Dennis	Deputy District Engineer	Houston	1
Gabriel Johnson	Director of TP&D	Houston	1
Joe Garza, P.E.	Assistant Director of Maintenance	Houston	1
Julian Budny	Director of Administration	Houston	1
Michael Alfor	Director of Maintenance	Houston	1
Pat Henry	Director Advanced Project Development	Houston	1
Rick McAlpine	Warehouse	Houston	1
Randy Hopmann	District Engineer	Lubbock	1
Mario Jorge	District Engineer	Pharr	1
Walter McCullough	District Engineer	San Angelo	1